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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 45. BARBADOS, JANUARY 2, 1903. 4 PRICE 1*d*.

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Picking and Ginning Cotton.

AMONG the points upon which the successful establishment of a cotton industry in these islands depends we may mention the picking and ginning of the cotton, and it must clearly be understood by all cotton-growers that success in the enterprise will largely depend upon the care which is exercised in the proper preparation of the cotton for market. It is just as important for the cotton grower to see to the picking and assorting of his cotton as it is for the fruit grower to pay attention to the handling and packing of his fruit.

In picking cotton it is essential that nothing but perfectly ripe bolls should be picked. If immature bolls—that is bolls that are not fully open—are allowed to be picked, the quality of the cotton will be depreciated. Cotton from unripe bolls is weak and brittle and high prices cannot be expected for it. The picker must have two hands free for the picking operation, and this is secured by his being provided with a bag, 2 feet by 3 feet, suspended from his shoulders. Each boll should be grasped firmly in the left hand while the right removes the contents. The bags when full may be emptied into sheets or baskets placed at convenient spots at the end of the rows; the sheets (if used) could be folded together and tied, and the cotton carried to the store in them. After a little practice the picker should find no difficulty in his work; but he must be given clearly to understand that no impurities are to get into the bag with the cotton. A careless picker will gather with the seed-cotton fragments of pods, leaves or twigs, and these will later on have to be removed. It is with the view of preventing this that arrangements should be made for the picker to have the free use of both hands.

After the seed-cotton is brought in, the next step

is the careful removal of any impurities. This operation is naturally very much simplified if the cotton is carefully picked in the first instance.

Now comes the sunning. The cotton is spread out and dried on arbours or platforms so that it may become as dry as possible. After that the cotton is assorted. This is a point to which special attention should be given. Planters must realize that a small quantity of indifferent cotton in a sample will cause the whole to be classed as indifferent; so that, possibly, a large quantity of really excellent cotton is sold at the price of poor cotton. If, however, the cotton is properly graded the higher quality cotton will fetch possibly a penny to two-pence more per pound. The small quantity of poor cotton will naturally be sold at a lower price. As is always the case with unassorted produce, its mixed character lowers the price of the better grade, while it cannot possibly raise the price of the poorer grades.

The next operation is 'whipping,' the object of which is to knock out all broken seeds, specks and motes. The cotton is thrown backwards and forwards (not rolled) on a large sieve, made of mesh wire netting strained over a frame, 3 feet long by 2 feet wide and 6 inches deep, through which the impurities fall. This last process should leave the cotton white and loose, ready for ginning.

Provided that these directions with regard to the picking and grading of seed-cotton are carefully carried out, there will hardly be any need for further picking during the ginning process.

In the United States an extra charge of $3·00 for every 1,200 lb. of seed-cotton is made for picking, assorting and whipping at the ginning factory. It is more convenient and economical for this to be done by the planter before it is sent to the factory.

There is another point to which cotton growers should pay attention. When once cotton has been picked and dried it should not be exposed to the weather. No harm can come from storing seed-cotton provided it is properly dried beforehand. It is advisable for the small growers to store their cotton in bags or barrels until there is a sufficient quantity to be sent to be ginned.

Since the high prices that are paid for Sea Island cotton are due to care in grading and to the removal of all impurities, the importance of paying attention to these points is obvious. In a recent letter to the Imperial Commissioner of Agriculture, the Secretary of the British Cotton Growing Association writes: 'I particularly wish you to impress upon the growers that every care should be exercised in picking and grading cotton; and also that it should be shipped in as large quantities as possible as it is very difficult to sell small lots. The qualities required in Sea Island cotton are length of staple, fineness, silkiness and cleanliness, and it must be carefully ginned and baled.'

SUGAR INDUSTRY.

Raising Seedling Canes at Antigua.

The following brief account of the efforts that have been made at Antigua to raise seedling canes is taken from the *Report on Sugar-cane Experiments in the Leeward Islands, 1902-3*:—

Considerable difficulty has hitherto been experienced in raising seedling sugar-canes in Antigua; for several years all results ended in failure, either no seeds germinated, or the very few which did germinate died at an early stage of growth.

In 1901, three seedlings were raised in the nursery, and produced well-developed plants for reaping in 1903.

During the arrowing period in 1902, Mr. Sands, the Curator of the Botanic Station at Antigua, made several efforts to obtain seedlings.

Arrows of D. 95 were selected, and in these pieces of arrows of White Transparent, Sealy Seedling and D. 95 canes were tied in order to provide pollen. Some of these arrows so treated were enclosed in muslin bags, but the bags were destroyed by the rain and the wind. The remaining arrows were not so enclosed, these escaped injury and were collected for seed. Under the circumstances one cannot be sure that the stigmas were fertilized by pollen from the arrows thus brought near them.

Other ripe arrows of various kinds were collected without any attempt to pollinate them with any specific pollen.

The arrows were sown at intervals from January 1903, and on this occasion a plentiful crop of seedling canes resulted. Amongst those germinating most freely were seeds in arrows of D. 61, Red Ribbon, Naga B. and D. 102.

The seedlings were planted out in a field at Skerrett's on May 5, 1903, as follows:—

183	seedlings	from	arrows	from	cane	D. 61.
56	,,	,,	,,	,,	,,	Naga B.
42	,,	,,	,,	,,	,,	White Transparent.
21	,,	,,	,,	,,	,,	D. 116.
77	,,	,,	,,	,,	,,	Red Ribbon.
112	,,	,,	,,	,,	,,	D. 102.
21	,,	,,	,,	,,	,,	Sealy Seedling.
35	,,	,,	,,	,,	,,	Sealy Seedling × D. 95.

Most of these are now growing freely; those which have satisfactory field characters will be submitted to chemical examination in the usual way. Should there result any canes of good promise, they will ultimately be tested by being submitted to experimental cultivation.

The Situation in Regard to Sugar.

A member of the Brussels Conference, who is closely interested in the West Indies, writes as follows as to the situation in regard to sugar in the United States and other markets:—

I do not quite follow what was said at Jamaica as to the effects of the withdrawal of the countervailing duties in the United States on bounty-fed beet sugar. It was there stated that Jamaica sugar was thereby prejudiced in the United States markets. My view is just the opposite. Germany (I think most of the bounty fed sugar in the United States came from Germany) gave a direct bounty of about 25*s.* or 30*s.* a ton. I forget the exact amount at the moment. This was countervailed. As the duty was taken off so is the bounty, so that as regards competition with Jamaica, the taking off the duty makes no difference. But besides the direct bounty of 25*s.* to 30*s.* there was a Cartel bounty of £3 a ton which was *not* countervailed, and which now goes, so that as regards German competition with Jamaica, Jamaica is in a better position than before. As a matter of fact, however, I do not think much German sugar went to the United States but that the real competition came from the home industry and the non-duty paying sugars of Hawaii and Porto Rico and that it was this that governed prices and not the European beet sugar.

I hear in some quarters great disappointment at prices of sugar keeping so low and even for delivery some time ahead. This latter is of course pure speculation and may be mistaken, but in any case the bounty fed stocks can hardly be worked off before March. When they are, we must, I think, either see a reduction in European production, or an increase in European consumption. The latter I think is certain, partly from the reduction of the excise duties in France, Germany and Belgium, and partly from the endeavours now being made on the Continent to encourage the production of sugared products, such as chocolate, etc., which the Sugar Commission has just ruled are not sugar as regards Article III of the Convention, and may be heavily protected.

Beet Sugar Industry in the United States.

The Secretary of Agriculture for the United States refers as follows in his Annual Report to the development of the beet sugar industry:—

In 1896, 29,220 tons were made; one year ago 220,000 tons were made. Careful estimates put the crop now being worked up at 260,000 tons. This is a more rapid development than has taken place in sugar-making with new conditions in any other country. The future of the crop depends upon the adoption of economic methods in field and factory. The growing of seed in the United States of a superior quality is assured, which will result in much richer beets and better yield than from imported seed that is never first class. Heavier tonnage per acre will come from better farming, and more economic economy from intelligent disposition of the by-products. The industry is well established.

Cocoa-nuts for Planting. To replant storm-destroyed cocoa-nuts and to extend the cultivation is a work of importance, and as there is some difficulty in getting plants here, the Board of Agriculture has arranged for importing from San Blas by the Royal Mail steamers. The nuts will be sold in Kingston at 10*s.* per 100. Applications to the Secretary of the Jamaica Agricultural Society, 4, Port Royal Street. (Jamaica *Times.*)

GEOLOGY IN RELATION TO AGRICULTURE.

In the introduction to a recently published text-book on *Agricultural Geology*, the author, Mr. J. E. Marr, M.A., F.R.S., writes as follows on the relationship between agriculture and geology:—

The student of agriculture is no doubt chiefly concerned with the thin covering of soil which in so many parts of the land conceals the solid rocks beneath; but a knowledge of these rocks is by no means useless to him. In the first place, much of the material which composes the soils is derived from the underlying rocks, and therefore varies according to their composition. The soil of a country composed of chalk is very different from that of an area where red sandstone is the prevailing rock, or of one in which clay is found beneath the soil.

Again, the degree in which the underlying rocks are pervious to water is important, not only on account of the influence which is exercised upon the soil above—a porous rock causing the soil to be drier than a less porous one—but also because of the dependence of water-supply on the porosity of the underlying rocks. An acquaintance with the elementary facts of geology, and with the general principles of the science, may often save a farmer the trouble and expense of securing the services of an expert in order to obtain a supply of water.

Many of the rocks which compose the earth's crust are serviceable to the agriculturist, or contain substances which are of service to him. It is useful to be able to know what rocks may be utilized for building purposes, for road-metal, and for fertilizing the soil.

Should he find it necessary to make road-cuttings, or to excavate pits or quarries on his property, it is important that he should have some acquaintance with the nature of the divisional planes which traverse rocks.

Lastly, although he is not directly concerned with the mineral substances which may exist beneath his land, which are not useful for agricultural purposes, the knowledge of the distribution of substances like coal and ores may prove to be very serviceable.

AGRICULTURE IN PERU.

The following extract from a letter from Mr. A. R. Gilzean, of Cerro Azul, Peru, to the Imperial Commissioner of Agriculture, is likely to be of interest to planters in these islands:—

It is a pity you have not got a climate and soil like those of Peru to work on. The climate here is the finest in the world. For the last four months the temperature has ranged between 58° and 66° F. In the summer months it goes up to 82° at times. The soil will grow anything. Seventy-five tons of cane from an acre is not uncommon, and the cane often contains 20 per cent. of sugar. The usual crop of cotton is from 600 lb. to 900 lb. per acre from plants and a little over half that from ratoons. It can be produced, packed, in the ports, at about 20*s.* per 100 lb. As it is selling just now at 40*s.*, everyone who can is planting it. Alfalfa grows splendidly here. It is the most wonderful food for stock that I have ever seen. It only thrives in the winter, so I fear it will never do for the West Indies. Rice of splendid quality is grown in the north of Peru. The country is very rich in minerals. Want of sufficient labour has been one of the principal drawbacks. Japanese can be landed here at £10 a head.

WEST INDIAN FRUIT.

THE COMPOSITION OF PINE-APPLES AND MANGOS.

Mr. H. H. Cousins, M.A., F.C.S., publishes in the *Bulletin of the Department of Agriculture, Jamaica,* for November, the results of analyses of pine-apples and mangos made at the Government Laboratory, Jamaica. Some of the results obtained are particularly interesting as showing the value of these fruits as food. The following is a brief summary of the results recorded in Mr. Cousins' paper:—

In the case of the pine-apples, representatives of nine different varieties growing at Hope Gardens were analysed. It is stated that the specimens were average fruits and may be taken as typical of pine-apples producible on the lighter soils of the Liguanea plain. The table of proportional parts—showing the proportion of top, rind, core and edible parts—brings out the great advantage to the purchaser of the 'Smooth Cayenne.' This variety with its particularly thin rind, contains 85·8 per cent. of edible matter; the remaining varieties average only about 55 per cent. The Ripley varieties, on the other hand, possess a large amount of rind, and this reduces the proportion of edible matter to about 55 per cent.

Turning to the chemical composition of the edible portion, we find the advantage rests with the 'Ripleys,' which contain about 20 per cent. of solid matter and 14 per cent. of sugar. The 'Smooth Cayenne' has 16 per cent. of total solids and 12·5 per cent. of sugar. The 'Queen' pine-apple also shows a high sugar-content. Mr. Cousins summarizes the results thus:—'Some of our varieties, such as "Sam Clarke," "Cheese" and "Cow Boy," are decidedly inferior. The "Queen" and the "Ripleys" are the sweetest varieties, and are, for local consumption, unsurpassed. For commercial purposes, however, the superior eating qualities of the "Ripley" are more than counterbalanced by the greater size, finer appearance and edible economy of the "Smooth Cayenne."'

Four varieties of mangos were analysed, viz., 'No. II,' 'Yam,' 'Bombay' and 'Black.' The superiority of the 'Bombay,' so far as edible economy is concerned, is most marked. It contains 65·1 per cent. of edible matter, as against 59·9 in 'No. II,' 55·2 in 'Yam' and 53·6 in 'Black.' This, of course, is chiefly due to the small size of the stone, so characteristic of these eastern varieties.

In the matter of sugar-content, however, the 'Black' leads with 16·66 per cent., the 'Yam' containing the least sugar, viz., 9·52. The 'Black' also contains a much higher proportion of solid matter than the other varieties. Of this mango Mr. Cousins states: 'As a food the "Black" mango holds the first place. A content of 22 per cent. of total solids, containing 17 per cent. of sugar, is truly remarkable for a fruit of this character.'

THE FOOD VALUE OF FRUITS.

Snyder, in his *Chemistry of Plant and Animal Life,* writes as follows on the food value of fruits:—

Fruits contain a large amount of water and a small amount of dry matter. The dry matter is composed mainly of non-nitrogenous compounds, such as starch and sugar. These foods all contain small amounts of nitrogenous compounds, of which the larger portion is in non-proteid forms. Organic acids, in small amounts, and essential oils are characteristic features.

When judged only on the basis of the nutrients present, many fruits would be assigned a low place in the list of foods, as they contain only comparatively small amounts. Most fruits are used in the dietary, not so much with the view of supplying nutrients as for other purposes. The organic acids, essential oils and soluble mineral compounds, together with the digestible form in which the nutrients are present, are the factors which give fruits their unique value. The organic acids and essential oils impart palatability and assist functionally in the digestive process. Some fruits, such as figs and prunes, contain chemical compounds which are laxative in character. In the human ration, fresh fruits are as essential, and occupy the same position, as roots and vegetables in stock rations.

THE LEMON TRADE IN SICILY.

The following is an extract from a letter from His Majesty's Consul at Palermo to the Secretary of State for Foreign Affairs, published in the *Dominica Official Gazette* of November 28, in which information is given on the prospects of the green fruit trade in Palermo:—

The fruit on the trees is abundant, but small; the crop is likely to be about 50 per cent. better than last year. The demand is feeble and prices low. This month, already 25,000 boxes have been exported, to 16,000 for the same period last year; half of this was last season's crop and half green fruit of this season's harvest. The low grade fruit not worth exporting is used for extracting the acid for the formation of citrate or else acetic [? citric] acid. It sells locally for 1*s.* 8*d.* per 1,000, at which price it does not pay for the gathering.

COTTON.

Cotton at St. Kitt's.

We extract the following information on the experimental cultivation of cotton at St. Kitt's from a paper by Mr. A. O. Thurston published in the *West Indian Bulletin*, Vol. IV, pp. 227-8 :—

Advices received by last mail report the sale of the first shipment of 12,000 lb. of lint at 1*s.* 1½*d.* per lb. From the experience gained during the past year, I have come to the following conclusions: (1) That the cotton industry is a promising one if the present prices last; (2) that low-lying lands capable of bearing good crops of cane are also the best for cotton; (3) that such lands should be well tilled and kept free from weeds from the time of planting to the development of the cotton bolls; (4) that during the process of cultivation the soil should be drawn up around the plants to keep them from being injured by wind; (5) that 4-feet rows on good lands and 3-feet in hilly or exposed situations, with single plants left in 12 to 15 inches apart, are good distances; (6) that June, July and August are the best months for planting; (7) that it is necessary to have on hand spraying machines and a sufficient supply of Paris green or other insecticide, to deal with a sudden inroad of caterpillars; (8) that the red stain bug can also do considerable damage to the quality of the cotton, and efforts should be made to keep it in check; (9) that the cost of labour required to cultivate an acre, from the time of preparation to the reaping of the cotton, under conditions prevailing here in lands recently under cane cultivation, does not exceed 15*s.*; and (10) that cotton is ginned much better if recently picked. In conclusion I may say that I purpose planting 350 acres in cotton this year.

Utilization of Cotton Seed By-products.

In the *Consular Report on the trade of Marseilles for 1902* reference is made to the utilization of the by-products of cotton seed in the manufacture of soap. The information is supplied at the request of Indian cotton growers and makers of cotton seed cake, who have made inquiries as to the processes by which their waste products might be converted into paper and soap. In view of a possible cotton seed oil industry in these islands the following information is likely to be of interest:—

Nothing is known in Marseilles as to the production and utilization of linter cotton. The cotton seed used by the Marseilles millers is imported solely from Egypt. The Egyptian seed gives no lint. There is only one large crusher of cotton seed in Marseilles. He does not decorticate the seed, and the hulls are pressed into shape for cattle feeding and for manuring the market gardens in the neighbourhood of Marseilles. The turn out of the cotton oil in Marseilles is limited by the sale of the cake, which alone enables the millers to work at a profit.

The supply of cotton seed from Egypt has been sufficient to meet the local demand. Some Indian trial importations were made, but shipments were discontinued owing to the seed being enveloped in lint and the oil obtained being inferior in quality to that given by the Egyptian seed. Marseilles soap manufacturers have established their reputation by the superior quality of their soap; and it is essential that the ingredients employed should be of the finest quality.

A common brown soap is made at Marseilles from the residue of cotton seed oil after refining, the process adopted in refining the oil making the residue suitable to the purpose. After crushing, the hulls are pressed into cake, the oil extracted is refined by caustic alkalis (soda), and the residue, after refining, is thus in itself an imperfect soap.

SEA-WEED AS MANURE.

It has long been known that sea-weed has valuable fertilizing properties. Sir Humphrey Davy in his *Elements of Agricultural Chemistry*, published in 1814, refers to its use as a manure on the sea-coasts of Britain and Ireland. Yet the value of this material is not generally recognized and it is probably not utilized to the extent it deserves. Naturally its use, on account of its bulky nature, is restricted to lands near the sea-coast; but in such places sea-weed might well be used as a means of enriching the soil.

It may be regarded as a 'general' manure, supplying all the constituents of plant food, and is therefore classed with such materials as farmyard manure, although it contains a much higher percentage of potash. It is especially useful on light, sandy soils on account of the large amount of humus which it supplies to the soil, a soil constituent which, on account of the rapidity of decay under tropical conditions, is too often deficient in West Indian soils. Watts in his *Introductory Manual for Sugar Growers* writes: 'This forms a valuable manure when ploughed in; by this means nitrogen and potash are supplied together with vegetable matter. About 20 to 30 tons per acre form an excellent dressing'.

On the sea-side sugar estates in Jamaica and also in Barbados, sea-weed is freely used as a litter for stalled animals or for pen manuring, and many cultivators have employed it with considerable success for yams and other starchy ground provisions, just as it has been used to increase the yield of potatos in other countries. In the United States Department of Agriculture, *Farmers' Bulletin* No. 105, an account is given of experiments in the use of sea-weed conducted by James Hendrick at Aberdeen University, Scotland, and by the Rhode Island Station staff in the United States, and gives the following summary of results:—

While sea-weed has been used for a variety of purposes it is chiefly valuable as a manure. For this purpose it might be classed with green manures and barnyard manure, though differing from the latter in its higher content of potash (largely soluble) and lower content of phosphoric acid. On account of its higher content of potash, sea-weed is best adapted to soils deficient in this element and to crops which are 'potash feeders' such as potatos, clover, etc. To secure a well-balanced fertilizer adapted to general purposes, the sea-weed should be combined with a phosphate of some kind. Sea-weed rapidly decomposes in the soil readily yielding up its fertilizing constituents to crops. It is therefore most economical to apply it to the soil as a top dressing or to plough it in in the fresh condition without previous fermentation.

An advantage of sea-weed over barnyard manure is its freedom from weed seeds, insects, and germs or spores of plant diseases.

POULTRY.

The following notes are taken from the *Farm Journal* of Philadelphia:—

Let poultry of all kinds fast at least twelve hours before killing.

First make a few hens pay you a profit, then start a large flock. Many a man has made a failure by starting on too large a scale.

No figures, however large, should tempt the breeder to sell his best birds. The best is none too good for the breeder who wants to keep his stock up to high standards.

The business hen is the well-bred hen selected for the purpose.

Many failures in poultry keeping have their origin in over crowding.

We have no respect for age when it comes to old hens that have outlived their usefulness. Better sell them at the market price.

A handful of sunflower seed, now and then, adds lustre to the plumage.

The Agricultural Experiment Stations tell us that corn is one of the very best foods for poultry; but they do not tell us to feed it exclusively. Corn exclusively is too heavy and too rich; something to make bulk must be added. We know of nothing better than bran.

SCIENCE NOTES.

The Formation of Carbohydrates in Green Plants.

It is a well-known fact that green plants, or parts of plants, in sunlight, are able to build up some form of carbohydrate from the carbon dioxide absorbed from the air and the water taken up from the soil. The process is accompanied by an evolution of oxygen about equal in volume to that of the carbon dioxide absorbed. The process is known as carbon assimilation or photosynthesis.

Very little is known of the intermediate stages in this process. Baeyer suggested that the carbon dioxide is decomposed into carbon monoxide and water, as represented in the equation:—

$$2\,CO_2 = 2\,CO + O_2$$

The water is also decomposed, according to this theory, into hydrogen and oxygen. The hydrogen and carbon monoxide are then combined into a body known as 'formaldehyde' according to the equation:—

$$CO + H_2 = CH_2O$$

and this formaldehyde is later converted into sugar.

One great difficulty in accepting this theory has been that there is no evidence that carbon monoxide is formed and that no proof has been offered that this gas can be made use of by plants, as it should be if Baeyer's theory is correct.

Some experiments have recently been conducted on this latter point by Messrs. Bottomley and Jackson, and an account of them is given in the *Proceedings of the Royal Society* (Vol. LXXII, p. 130). The following abstract of the paper by Prof. Reynolds Green is taken from the *Botanisches Centralblatt*:—

The authors publish a preliminary account of researches made on the power of green plants to utilize carbon monoxide with a view to the bearing of the work on Baeyer's theory of photosynthesis. Their results are:—

(1) Plants of *Tropaeolum* will thrive in an atmosphere containing carbon monoxide without a trace of carbon dioxide, provided that the quantity present exceeds the normal quantity of carbon dioxide in the proportion of the relative solubilities of the two gases in water. Greater quantities might be present, even up to 70 per cent., so long as oxygen was present in normal amount.

(2) In bright sunshine a negative pressure is always observable in the bell jars containing plants growing in the monoxide, the volume of oxygen exhaled being only half that given off when the dioxide is supplied.

(3) Starch is formed in plants supplied with the monoxide and exposed to sunlight. It was found in the leaves and in the green stems, especially crowded around the vascular bundles.

(4) Seeds can be germinated and seedlings grown in an atmosphere containing as much as 65 per cent. of carbon monoxide, organic compounds of carbon being formed during the process.

The Custard Apple.

We gave on page 390 of the last volume of the *Agricultural News* a note on the sour sop (*Anona muricata*) together with an illustration showing the fruits and leaves of the tree.

Fig. 1. CUSTARD APPLE.
[*Kew Guide.*]

Fig. 1 shows the fruit and leaves of a closely allied tree—the custard apple (*Anona reticulata*).

The tree bearing this well-known fruit is common in most of the West Indian Islands. The fruit is not as popular as that of the sour sop.

It is more or less oval in shape and possesses a much smoother skin than the sour sop. In Grenada this fruit is called the 'Bullock's heart,' which is evidently a reference to its peculiar appearance.

The leaves and young twigs are used for tanning, while a black dye is said to be obtained from the unripe fruit.

NOTES ON SOME ESSENTIAL OILS AND DRUGS.

Considerable interest has been aroused from time to time in the West Indies upon the subject of the possibilities of a trade in essential oils. At the West Indian Agricultural Conference, 1902, a valuable paper was read by Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens, Trinidad, on the 'Preparation of Essential Oils in the West Indies.' This paper will be found in the *West Indian Bulletin*, Vol. III, pp. 171-8, together with some interesting remarks on the same subject by Dr. H. A. A. Nicholls, of Dominica. We give below further notes on some of these oils:—

OIL OF GUAIAC WOOD.

This oil is the product of lignum vitae (*Guaiacum officinale*) which is of common occurrence in these islands. The wood is chiefly obtained from Cuba and Hayti. An allusion is made to its export from the latter island in the *Agricultural News*, Vol. II, p. 360, where it is stated that the export has increased greatly of late, 3,048 tons of wood and 27 tons of gum being exported during the year 1902. The wood is exported in the form of logs.

The following reference is made to the oil of guaiac wood in the semi-annual report of Messrs. Schimmel & Co., of Miltitz, London and New York:—

The importation of raw material has ceased completely, and as a consequence the prices have advanced by more than double. We were in the fortunate position of being able to provide our clients with abundant supplies, but at present stocks are entirely exhausted and no supplies of wood in sight.

From a voluminous essay which was awarded a prize by the Medical Faculty of Rostock University, and which is entitled: 'Contributions to the knowledge of guaiac preparations,' we abstract the following details of the physiological action of oil of guaiac wood and of guaiol:—

Both preparations have the same action on the animal organism. Oil of guaiac wood passes without injurious effect through the organism of mammals. The central paralysis observed on frogs is produced by many essential oils in doses of a centigram. Guaiol is also free from toxic effect on warm-blooded animals, and it has no share (or only a very unimportant one) in the paralysing effect of the oil. It passes almost completely unchanged through the organisms, and only traces of glycuronic acid can be detected in the urine.

LEMON GRASS OIL.

This oil is the product of the lemon grass (*Andropogon Schoenanthus*). The oil has been exported from time to time from these islands in small quantities, but it is hardly correct, as stated in the following note, also taken from Messrs. Schimmel's report, that the cultivation of these grasses is extending to any great extent:—

The value of this article unfortunately appears to remain at its present exceedingly high level; it should prove highly remunerative to the manufacturers on the Malabar coast, if it is taken into consideration that the former normal price was less by half than what it is now. Stocks of any importance exist nowhere. There can therefore be no doubt that the high prices will remain in force. We have repeatedly mentioned in our reports that the cultivation of andropogon grasses in the West Indian Islands appears to be extending more and more, as during the last few years we have frequently received from those countries samples of oils which were derived from this species of grass, and which were partly citronella oils, and partly oils of lemon grass.

OIL OF PIMENTA.

We give the following extract from the above-mentioned report referring to oil of pimenta, but it should be noted that it is not stated whether this oil is prepared from the leaves of the pimenta tree (*Pimenta officinalis*):—

Colourless or pale-yellow, subsequently brown; soluble in spiritus fortior in every proportion; when shaken with the same volume of caustic soda lye, an almost solid mass should be formed; the solution in an equal volume of spiritus fortior should only have a very feeble acid reaction; test for carbolic acid.

VANILLIN.

Vanillin is the scent-yielding or aromatic constituent of vanilla fruits, in which it usually occurs in the proportion of about 2 per cent. It is found on the surface of vanilla pods in the form of minute glistening crystals. It is prepared artificially from coniferin, a substance occurring in the sapwood of some of the *Coniferae*. The following scientific note on this substance is also taken from Messrs. Schimmel's report:—

The decline in the value has not only come to a standstill, prices show even an advance. They may have to be raised still further, should those of clove oil, which forms the material for vanillin, continue to rise.

It will be known that vanilla fruit, in the state in which it is gathered, does not in the least possess the characteristic odour of vanilla. It only acquires this odour by suitable treatment. H. Lecomte has now studied the conditions which bring about the formation of vanillin, which imparts the wonderful perfume to the fruit. According to the researches of the above-named scientist, there exist in the vanilla plant two ferments, which differ in a marked degree from each other in their functions. The one, an oxydase, is present in the individual organs of the plant, such as the leaves, shoots, and their aqueous extracts, in the green and ripe fruit which has not yet been worked up, and in the prepared commercial fruit. Lecomte detected it in these organs of plants of different origin, by means of G. Bertrand's reaction. At the same time, the presence of manganese salts was observed in all products, which renders it not impossible that they stand in some relation to the above-named ferment. The second ferment is contained in the sap of the vanilla, and produces, as a hydratizing ferment (in the manner of diastase bringing about the conversion of starch into grape sugar), the formation of a substance which shows the same reactions as those which have always been met with in the vanilla plant. With regard to the mechanical treatment of vanilla, it would appear in the first instance as if it counteracted the function of the ferment. It consists, as is well known, of the immersion of the fruit during twenty seconds in water of 85° C., a manipulation which might bring about the destruction of the ferment. But the author has convinced himself that a temperature of about 50°, such as the interior of the fruit probably only reaches during the short duration of the process, really promotes the function of the oxydase.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 15 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

VOL. III. SATURDAY, JANUARY 2, 1904. No. 45.

NOTES AND COMMENTS.

Barbados Cotton in the English Market.

Information has been received by the Imperial Commissioner of Agriculture from the British Cotton Growing Association with regard to the sale of cotton recently shipped from Barbados. Of the 18 bales shipped, 11 were sold at 12½*d.* per lb. and 7 at 13½*d.* The cotton is reported as being 'good staple, clean, fairly well prepared, but rather deficient in strength.'

Utilization of Sea-moss.

Samples of sea-moss were recently received from Dr. Numa Rat, of Anguilla, at the office of the Imperial Department of Agriculture. Dr. Rat mentioned that this moss is exported from Anguilla in some quantity to British Guiana, where it is retailed at 8*d.* per lb., and suggested that an export trade might be developed.

Messrs. Knight & Co., druggists, of Barbados, to whom a sample of this moss was sent, do not consider that the prospects of such a trade are at all promising, since a similar moss is collected locally and sold at from 6 cents to 12 cents per lb. A sample has also been forwarded to Professor Dunstan, of the Imperial Institute, with a request that he will endeavour to obtain information as regards the value of this product.

Another use for this sea-moss, suggested by Dr. Rat, is in the preparation of a paste ('stickphast'). As such the product has been found entirely satisfactory, and it is possible that a sale might be obtained for it, if it can be manufactured at a sufficiently low price.

Ginning Cotton at Barbados.

We understand that at a meeting of the Cotton Committee of the Barbados Agricultural Society, held on Friday November 27, 1903, it was decided to fix the price for ginning and baling cotton at the Central Cotton Factory at 3 cents per lb. of lint.

It is generally accepted that during the coming crop seed-cotton in all parts of the West Indies will be ginned at the rate of 3 cents per lb. It is essential, however, that the cotton be sent to the factory carefully assorted and whipped beforehand.

Cotton Cultivation in Trinidad.

The following is a brief summary of a paper, published in the *Proceedings of the Agricultural Society, Trinidad*, showing the state of cotton cultivation in that island at the end of September 1903, as reported in replies to a circular sent to all who had received seed from the Botanic Gardens. Thirty-one circulars were sent out, and fifteen replies received:—

There are about 52½ acres under cotton, some 340 lb. of seed having been sown. Of the seed sown only about 46 per cent. germinated. From the replies as to the state of the cotton, we gather that on about half the estates the cotton was 'growing well,' while in the other cases it was reported as 'fair.'

Jamaica Exports.

The Annual Report of the Collector General for the year ended March 31, 1903, is published as a supplement to the *Jamaica Gazette* of November 19, 1903.

The exports show a net increase of £353,193, or 18·2 per cent. over those of the previous year. The increases occur chiefly in the following:—cocoa-nuts, bananas, grape fruit, ginger, pimento and rum. A decrease in quantity and value is, however, recorded in respect of cacao, horses and mules, and lime juice.

The following remarks by the Collector General with respect to certain articles of export are of interest:—

'The increase in the output and the price obtained for ginger are encouraging. Jamaica ginger has a reputation for its excellent quality, but on account of the primitive method of preparing it for market, and the little attention paid to sorting and grading, Cochin ginger (which is of less intrinsic value than Jamaican, but is much better graded and sorted) obtains a higher price in the English market. It is hoped that the increase in our exportation recorded this year is an indication that exporters are paying attention to the need of careful preparation for market, by which the confidence of buyers may be established by successful competition carried on in the foreign markets. The honey industry is a flourishing one and the appreciable increase in this year's output is one of the welcome signs of the awakening of the small settler to the knowledge that there is within his easy reach means of adding to his income, and the remunerative price obtained should be encouragement to continued effort on his part.'

Variation in the Composition of Cows' Milk.

A report on experiments, conducted in the laboratory of the Agricultural Department of the University of Cambridge with the object of observing the effects of variations in the times of milking on the composition of cows' milk, is published by the Board of Agriculture, England, in the *Annual Report on the distribution of Grants for Agricultural Education and Research.*

Three cross-shorthorn cows were chosen; one was a good milker, the second a very fair milker, while the third was a poor milker. For the first fourteen days they were milked at regular intervals of twelve hours; during the second fourteen days the periods between the times of milking were unequal, viz., sixteen hours and eight hours alternately.

It was found that the secretion of fat was considerably influenced by the alteration in the times between the milkings, while the solids not fat were only slightly affected. A larger quantity of milk was obtained after the longer period of secretion but the milk was poorer in fat. The fat appeared to vary inversely as the quantity of the milk.

The experiments also appear to show that the cow giving the best milk was the one which showed the greatest variation.

Minor Industries of the West Indies.

The *West India Committee Circular*, of December 2, has an interesting article on the subject of our minor industries. The writer after pointing out that there has been in the past an almost entire dependence upon the cultivation of sugar in these islands and that, with the exception of the cacao industry of Trinidad and Grenada, the lime juice industry of Montserrat and the banana trade of Jamaica, there has been an entire absence of minor industries, refers to the establishment of the Imperial Department of Agriculture as the 'first step towards the propagation of "minor industrialism,"' and to the labours of Sir Daniel Morris in so sedulously fostering the knowledge of cultivation as 'forming a splendid sequel to this act.'

Reference is made to the planting of cotton and to the possibility of the West Indies soon becoming recognized as a cotton-producing centre, and also to the desirability of greater attention being paid to the cultivation of cocoa-nuts. After touching briefly upon several other industries, the writer states: 'And yet one hesitates to condemn those who have so far neglected the sources of income which have lain so close to their hand, for the individual is powerless to improve his lot unless directed in the way he ought to go. Hence one welcomes the work of the Agricultural Department, one welcomes the agricultural education which should never have been sacrificed to a more classical curriculum, one welcomes the local agricultural shows; so, too, one hopes to see the establishment of co-operative societies for local sale, of agricultural banks for deserving workers and of ready transport facilities to markets near and far.'

Coffee Culture in Queensland.

The *Queensland Agricultural Journal* for November contains the Annual Report of the Secretary for Agriculture and also that of the Instructor in Coffee Culture. From these reports we learn that the production of coffee in Queensland is only about 45 per cent. of the consumption. From 1895 to 1901 the area planted in coffee steadily increased, and while there was a decrease in 1902—attributed to the extraordinary season—it is to be hoped that this cultivation will be extended considerably. The production in 1901 amounted to 130,293 lb.

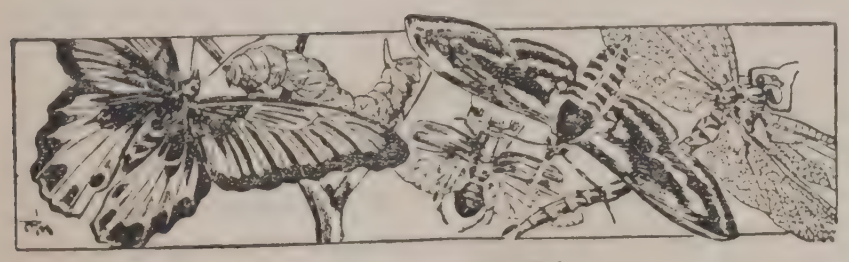
During the year ended June 30, 1903, fair to good crops have been obtained on most of the estates, especially on those which have received cultural attention. The Instructor is able to report considerable improvement in the methods adopted both in the field and in the curing house. From the following quotation it will be seen that the prospects for coffee-growers in Queensland are distinctly favourable: 'With an industry capable of extension to twenty times its present size before any grave consideration need be given to exportation, no fear need be entertained regarding the advisability of the cultivation of coffee in the Commonwealth on account of the apparent surplus in the world's supply of low-grade coffees as would seem to be entertained in some quarters.'

Forest Resources of Trinidad.

We have received a copy of a paper read at the Victoria Institute, Trinidad, on March 7, 1903, by Mr. C. S. Rogers, Forest Officer, on 'The Forest Resources of the Colony.' In 1898 a committee was appointed to report on the subject of forest conservancy; as results of the report of this committee may be mentioned the visit of Mr. F. Lodge, of the Indian Forest Service, in 1900, the appointment of Mr. Rogers as Forestry Officer, and the adoption of a forest policy by the Government. This policy is summarized by Mr. Rogers as including 'the reservation of certain areas of land from sale and their management as forests for the protection of the climate, the regulation of the water supply in the rivers, the prevention of landslips and floods, and the production of timber and other forest produce.'

The total exports of timber from Trinidad were valued at £8,779 in 1901, as against £12,802 in 1900. This decline is principally due to the fact that the easily accessible forests have been exhausted.

Mr. Rogers emphasizes the necessity for systematic examination of all forests with a view to estimating the available supply. The chief difficulty lies in the fact that so few of the forests have been created by planting. Planters are urged to create new forests by planting and to improve the natural forests by adding valuable timber trees. The worthless trees should be cut out and in their places hard woods should be substituted. In the case of cedar forests planting has not been found necessary. The poorer trees have been cut out and removed, and a fine crop of young cedar has sprung up.



INSECT NOTES.

Thrips on Cacao and Onions.

In a recent report the Acting Agricultural Instructor at Grenada draws attention to the increasing severity of the attacks of the cacao thrips. It is stated that on many estates and cultivations the ravages of this insect have been so serious as considerably to decrease the yield. Vigorous action on the part of planters in Grenada is most necessary. An obstacle in the way of getting rid of this pest appears to be the fact that it also attacks a variety of other trees, wild and cultivated. Suggestions as to the treatment of the cacao thrips will be found in the *Agricultural News*, Vol. II, p. 88; while fuller information is given in the *West Indian Bulletin*, Vol. II, pp. 176 and 288.

Thrips appeared last year and did some damage to the onion crops in Barbados. The pest has again appeared this season but has fortunately done little or no damage as yet. No successful remedy for thrips has yet been found, but trials are being made of various washes which, it is hoped, will prove effective in combating the pest.

Some Peculiar Insect Structures.

It is a general rule among all animals, except the very lowest, that individuals are bi-laterally symmetrical. This means that if a line were drawn down the back from front to rear or from head to tail, the right side would be like the left, and the organs and appendages of one side just like those of the other. This is especially true of insects, and in this group of animal life the exceptions to this rule are very rare.

Thrips, however, presents a very striking exception, or a good example of asymmetry as it is called. This is noticed in the mouth parts.

The jaws of insects are at the sides of the mouth and work laterally, meeting in front. There are two pairs, the larger of which are mandibles and the smaller maxillae, the upper lip (labrum) and the lower lip (labium) form the upper and lower walls of the mouth. There are many modifications of these parts in different orders of insects, but these modifications rarely affect the symmetry.

In the flies these are so manifest as to form a regular proboscis for sucking. In many bees and wasps the mandibles are but slightly modified, while the other parts form a proboscis which is used for sucking, but this is accomplished by a long tongue which reaches to the top of the proboscis, and the process is more a lapping action than real suction, as in the flies. The butterflies and moths and the bugs, such as plant lice, scale insects, lice, bed bugs, etc., have real sucking mouth parts, but the larvae of butterflies and moths all have strong mandibles for biting. Beetles (hardbacks), grasshoppers, cockroaches and pond flies have typical biting mouth parts in larval and adult stages.

In the case of the thrips, however, we have a rather large group of insects of world-wide distribution among which asymmetry of the mouth parts seems to be the rule. On the left side of the mouth is a large mandible, while on the right there is none or only the merest trace of a rudimentary jaw, and the upper lip is modified accordingly. The right half is well developed, while the left is very much atrophied.

Although the right mandible is comparatively large, the insect feeds by sucking and the mandible merely serves for piercing the tissue and not for chewing.

A very good description of the asymmetry of the thrips with drawings is given by Dr. W. E. Hinds in his monograph on the *Thysanoptera* of North America, published by the United States National Museum, Washington, D.C.

Insects are normally unisexual, but cases occasionally occur where both sexes are united in one individual. This is known as hermaphroditism and is the cause of another form of asymmetry. It is especially noticeable in those insects in which there is a marked difference in the form, size or colour of the male and female. Professor John B. Smith, in his *Economic Entomology*, says that no true hermaphrodites occur among insects, but since the writing of that book several instances have been recorded and the specimens preserved in different collections where they may be seen.

Instances are on record of hermaphroditism in moths, the females of which are large, light-coloured, with slender antennae, the males much smaller, darker-coloured with feathery antennae. The hermaphrodite found has one side distinctly male and the other distinctly female; one side of the body is dark with the small dark wing and the feathery antennae of the male, while the other is light with the large light-coloured wings and slender antennae of the female.

The former of these two cases of asymmetry is very general with the entire order *Thysanoptera* to which thrips belongs, and which is considered to be one of the most primitive of all the orders of insects and one of the oldest orders geologically. The latter, however, is only occasionally found and is not confined to any order or group of insects, and must be regarded as a reversion to type, pointing to a remote ancestry in which both sexes were united in one individual, as in the case in the present-day forms of snails, slugs, and earthworms, and away from which insects, in common with many other forms of animal life, have developed by processes of evolution.

ONION SEED AS AFFECTED BY AGE.

The following account of experiments in connexion with the germination of onion seed is taken from *American Gardening* of October 17:—

Since November 1, 1896, the Connecticut Station has examined samples of onion seed, both grown in that State and in California. While the number of samples examined of California-grown seed is not large enough to make a close comparison, it is quite evident that a larger percentage of the California seed germinates than of the Connecticut seed.

It is also shown that onion seed more than one year old, as a rule, has much less sprouting capacity than new seed. Whether the plants produced from old seed are as vigorous and productive as those from fresh seed is quite another question, on which laboratory germination tests can give no light. The average sprouting capacity of four average varieties, of which a considerable number of samples has been tested, shows that the three Globe varieties and the Wethersfield Red are essentially alike in sprouting capacity, but the White Portugal appears to be distinctly inferior.

EDUCATIONAL.

Agricultural Scholarships.

As notified in the *Agricultural News* (Vol. II, p. 333) the Imperial Department of Agriculture recently offered for competition two scholarships tenable at Harrison College, Barbados, of the annual value of £75, one for the Leeward Islands and one for the Windward Islands. The examinations for these were held at Antigua, Grenada and St. Lucia on December 1, and following days.

The Scholarship for the Leeward Islands has been won by A. H. Boon, of Antigua, and that for the Windward Islands by G. O. M. O'Reilly, of St. Lucia. The following list of marks shows the position of the various candidates at the examinations :—

Grenada—	
C. Cornwall	126
E. N. Smith	256
St. Lucia—	
H. E. Belmar	456
G. O. M. O'Reilly	505*
Antigua—	
A. H. Boon	406*
G. A. Goodwin	154
F. H. Malone	376

A local Agricultural Scholarship, tenable at Harrison College, Barbados, was recently offered for competition. As a result of the examination R. C. Hunt has been awarded a scholarship of the value of £16, and the scholarship held by C. A. Hinds has been increased from £16 to £21 per annum.

DEPARTMENT NEWS.

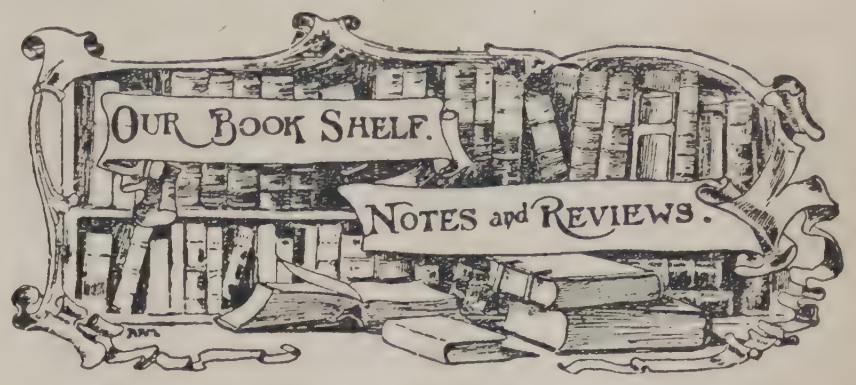
A conference of cotton growers was held at the Court House, Kingstown, St. Vincent, on Thursday, December 17, 1903, at which the Imperial Commissioner of Agriculture gave an address on the cotton industry.

Sir Daniel Morris spoke on the cultivation and picking of cotton and its preparation before it is sent to be ginned. He also explained the proposed working of the Central Cotton Factory now in course of erection at Kingstown.

Sir Daniel Morris returned to Barbados by R.M.S. 'Eden' on Saturday, December 19.

The Imperial Commissioner of Agriculture left Barbados in S.S. 'Orinoco' on the 29th. ultimo on an official tour in the Northern Islands and to confer with Sir Gerald Strickland in reference to the cotton industry and other matters of immediate interest in the Leeward Islands. It is probable that Sir Daniel Morris will return on or about the 10th. instant.

Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, proceeded to Montserrat on the 29th. ultimo to undertake a further investigation of the disease affecting cotton in that island.



THE SOIL: An introduction to the scientific study of the growth of crops. By A. D. Hall, M.A., *London: John Murray, Albemarle Street, 1903.* Price 3*s.* 6*d.*

This volume by Professor Hall, Director of the Rothamsted Experimental Station, formerly Principal of the South-eastern Agricultural College, Wye, is primarily intended, as stated in the preface, 'for students of our agricultural colleges and schools, and for the farmer who wishes to know something about the materials he is handling day by day.'

We unhesitatingly recommend this book to all who desire to make themselves acquainted with recent investigations connected with the scientific study of soils. The subject is dealt with by Professor Hall in such a way as to be perfectly intelligible to readers who may not have made a special study of agricultural chemistry.

The chemical, physical and biological problems in the study of soils are here placed before the reader, who is thereby enabled to appreciate the amount of information that has resulted from investigations carried out along these lines. Throughout the whole of this book the close connexion between science and practice is brought prominently forward. The influence of the various tillage operations upon the fertility of the soil, the relation of living organisms to soil fertility, the causes of sterility, and the possibilities of soil improvement are among the subjects upon which the reader will find this book shedding light.

We would draw special attention to the seventh chapter, dealing with the living organisms of the soil. An interesting account is given of the progress of our knowledge during recent years in this section of agricultural science. It is shown how the soil, formerly regarded as a mass of inert matter, is now regarded as being full of life, as containing thousands of minute organisms, which are now known to be responsible for many of the changes which were until recently thought to be of a purely chemical nature. Consequently soil fertility is no longer considered to depend solely upon the amount of plant food contained in the soil; other questions, such as the healthy condition of the soil as regards the life of soil bacteria and their ability to carry on their important functions, have to be taken into consideration.

DIE KULTUR DES KAKAOBAUMES UND SEINE SCHÄDLINGE: By Ludwig Kindt. *Hamburg: C. Boysen, 1904.*

This is a recently issued text-book on the culture and diseases of the cacao tree. It appears to be a complete and concise guide for the cacao planter and to such as are able to read German will be found very useful.

A detailed description of the plant is given as well as information relating to its requirements, both cultural and climatic. The author deals at considerable length with the subject of shade and suitable plants for inter-cropping. A section is also devoted to the gathering of the crop and its preparation for market. In Part II an account is given of the insect and fungoid pests of cacao, and here, as in Part I, the text is very well illustrated.

GLEANINGS.

Information is desired by Mr. Herbert Barclay, of Georgetown, British Guiana, as to the method of manufacturing cocoa-nut oil into lard. Possibly some of the readers of the *Agricultural News* will be able to supply this information.

According to a despatch from Havanna to the *Fruit and Produce News* of New York, numerous experiments are being conducted in cotton growing in Cuba. It is claimed that the experiments are entirely successful and that a yield of 2 bales of long, fine, Sea Island cotton per acre will be obtained.

The Comptroller of Customs, British Guiana, states in his annual report that the total value of exports of colonial produce, other than sugar, rum and molasses, exceeds the average of the previous five years by $127,806·89 and amounted to 29 per cent. of the total value of the exports of the colony.

It may not be generally known that ramie is used in the manufacture of mantles for incandescent lamps. *Indian Planting and Gardening* quotes the *Journal of Gas Lighting* to the effect that 'the demand for ramie mantles has grown enormously of late, and most large buyers are specifying ramie mantles in their orders.'

The Mexican cotton boll weevil is steadily spreading in the United States. It has, however, not yet reached the eastern cotton-growing States. It is probable that Congress will be recommended to appropriate a sum of $5,000,000, to be expended by a commission under the direction of the Secretary of Agriculture in combating this pest.

A sample box of sliced cassava tuber has been received at the office of the Imperial Department of Agriculture from St. Lucia. This sample was prepared at the Dennery Sugar Factory where the slicing is done by a machine invented by Mr. A. J. Pollonais. Dried cassava is shipped from several of the West Indian Islands to be used in the manufacture of glucose.

The new molasses food, molascuit, originating in Demerara, is gaining ground rapidly. As we have previously stated in these columns, its success lies in the fact that sufficient of the cane cellulose is mixed with the molasses to permit its transportation as dry material, and this cane cellulose is found to be very largely digestible. Contracts for its delivery are now making in England on the basis of 45 per cent. saccharine matter, and the Argentine government is reported to be using molascuit for its cavalry horses with successful results. (*Louisiana Planter.*)

Mr. Antoine Polimeni, of 12, Mark Lane, London, E.C., is desirous of opening correspondence with growers or merchants, dealing with concentrated lime juice, raw lime juice and oil of lime in the West Indies.

According to the Jamaica *Gleaner* of December 9, the experiment in growing rice at the Prison Farm is an entire success. There are upwards of 3 acres in rice laden with grain. The yield is expected to be about 70 bushels to the acre. Good results have also been obtained in the cotton experiment plot, from which a large quantity of cotton has already been gathered.

Colonel H. W. Feilden, C.B., of Burwash, Sussex, writes to the Imperial Commissioner of Agriculture :

'Robinson Crusoe was quite correct when he described the Caribs landing on Tobago as cannibals. I worked at a kitchen "midden" on the shore, several times, and found in it human bones fractured and charred, along with those of a seal, shells of course, and broken implements.'

The Board of Agriculture of British Guiana has issued a notice that with a view to encourage the cultivation of cotton in the colony his Excellency the Governor offers a prize of $50 to the grower of the largest area in cotton, cultivated and reaped before June 30, 1904. Only those possessing or controlling less than 51 acres of land will be eligible for this prize. A second prize of $10 will be given to the next best competitor.

Mr. A. K. Agar, Honorary Secretary of the Dominica Agricultural Society, has contributed the following note :—

'At a general meeting of the Dominica Agricultural Society, held on December 16, the Hon'ble F. Watts gave a very interesting address to a large number of members. He described in full the testing of both raw and concentrated lime juice, and advocated the planting of hedges of pois doux (*Inga laurina*) through lime plantations, as is done in Guadeloupe, as a means of protecting the soil.'

In reference to the note in the *Agricultural News* (Vol. II, p 412) on the fruiting of the 'Traveller's Tree' (*Ravenala madagascariensis*), Mr. J. B. Dopwell, Foreman at the St. Vincent Botanic Station, writes that one of these trees at the Station fruited in 1901, and a few plants were raised from the seed. Although none of the eighteen trees at the Station fruited in 1902, fruits were this year observed on the same tree that fruited in 1901. A few plants have again been raised from seed.

Reference has been made in the *Agricultural News* (Vol. II, p. 283) to the export of monazite sand from Bahia in Brazil. According to the *Consular Report on the Trade of Bahia for 1902* there is a considerable decline in the value of this sand. The following extract is of interest :—

'This article continues to be a monopoly in the hands of the one firm which secured valuable concessions in the Prado district of this State in 1899. Various attempts are made from time to time to develop other new sand-bearing districts, but hitherto the percentage of thorium discovered has not proved sufficiently high to enable the sand to be put on European markets at a profit, after the export and State duties (in all about £8 per ton) have been paid.'

WEST INDIAN PRODUCTS.

Cocoa-nut Meal and Molascuit in Canada.

The following letter, addressed by the Commissioner of Customs at Ottawa to Mr. J. Russell Murray, Agent for this Department in the Dominion of Canada, is of interest :—

Ottawa, November 28, 1903.

I have the honour to acknowledge the receipt of your letter, of the 14th. instant, to the Hon'ble Minister of Customs in regard to the free entry of cocoa-nut meal and molascuit when produced in the British West Indies and imported into Canada.

In reply I am to state that cocoa-nut meal is admitted to free entry under item No. 559 of the tariff as palm nut meal.

You state that molascuit is the fibre of the sugar-cane after it has passed through the crushing mills, then mixed with a low grade molasses and prepared for stock feeding.

Under the Customs Tariff of 1897, the duty on this article (molascuit), composed as above stated, would be 20 per cent. *ad valorem*, subject to a rebate of one-third of the above duty under the preferential tariff, when produced, in and imported direct from, the British West Indies.

An Act of Parliament would be necessary to change the duty in this case, and I am unable to state what action Parliament may be inclined to take in the matter.

I may point out, however, that under the tariff as it stands now, the British West Indies have a tariff preference of $6\frac{2}{3}$ per cent. in their favour, as against foreign competitors, in respect of molascuit imported into Canada.

If the article were placed on the free list, this tariff advantage in favour of the British West Indian product would disappear.

I have, etc.,
(Sgd.) JOHN McDOUGAL,
Commissioner of Customs.

West Indian Products in Canada.

The following extracts from a report by Mr. J. Russell Murray, Agent of the Imperial Department of Agriculture at Montreal, on West Indian business in Canada, dated December 7, 1903, will be of interest to growers in the West Indies :—

Cocoa-nuts : All grades of West Indian nuts are of ready sale if up to the standard of $3\frac{5}{4}$ inches in diameter and weighing not less than 140 lb. per bag of 100 nuts. We can place a contract of 200 to 400 bags per month.

Jamaicas, $28 to $30 per 1,000, duty paid in Montreal.

Cacao : Offerings of new crop will now find market. Demand steady and prices in sympathy with New York.

Trinidad, 14c. to 15c. per lb. ; Grenada, 13c. to $13\frac{1}{4}$c.

Coffee : Market continues to advance and fair business is being transacted for all grades.

West Indian, 12c. per lb. ; Jamaica, 8c. for ordinary and 10c. for fair to good.

Sugar : The markets are flat owing to a general holding back of business in the United States until the Cuban reciprocity treaty is passed. No large lots have arrived in Montreal during the last two weeks.

Molasses : Market continues firm owing to short supplies of New Orleans, and prices have advanced 1c. to $1\frac{1}{2}$c. per gallon. Barbados may be quoted to-day at 42c. to 47c. (inland cities).

Molascuit : During the coming crop every effort should be made to develop this product. There will be a large market for it in Canada, and I should be glad to arrange contracts for producers. Samples of this product from Demerara have created a most favourable impression among the stock-farming interests.

AGRICULTURAL SHOWS.

Barbados.

The Annual Agricultural and Industrial Exhibition of the Barbados Agricultural Society was held at Harrison College on December 21. Owing to the very inclement weather which prevailed on the three or four days preceding the Show, the exhibits were not as numerous as in previous years, but were on the whole of comparatively high quality.

The Imperial Department of Agriculture offered three special prizes of $5·00 each, namely :—

For the best collection of fruit.
For the best collection of meals.
For the best collection of vegetables.

Ten 'Diplomas of Merit' of the Department were offered, of which six were awarded as follows :—

Yams	Castle Grant plantation.
Pepers (fresh)	Mr. Francis Lythcott.
Grape fruit	Castle Grant plantation.
Muscatel Grapes ...	Mr. Jas. T. Bourne.
Cured and Pickled Hams and Bacon ...	The Zenith Packing Company.
Salted and Pickled Fish	Mr. G. W. Hunt.

The stud Anglo-Nubian billy 'Black Rock' and the Toffenburg billy 'Bruce,' imported by the Department with the object of improving the local breed of goats, were on show and attracted much attention.

As usual the good quality of the ground provisions and vegetables was one of the striking features of the Exhibition. Another point of interest in connexion with this show was the exhibit of specimens of local minor industrial products—cured hams and bacon, biscuits, oleomargarine and preserved fish ready for export. It is to be hoped that these minor industries may so develop as not only to decrease the number and value of the imports in their respective lines, but to build up an export trade with the neighbouring colonies.

Forthcoming Shows.

Arrangements are being made for the holding of the following Shows under the auspices of the Imperial Department of Agriculture :—

Antigua : February 1904.

Barbados : The Local Industrial Exhibition and Show of Stock for Peasant Proprietors will be held at Lower Estate, St. Michael, on January 12, 1904.

Dominica : Sixth Annual Show to be held in February 1904.

Montserrat : The Fourth Annual Show, under the auspices of the Imperial Department of Agriculture, will be held in the Market during the month of February 1904.

St. Vincent : It is proposed to hold an Agricultural Show on March 10 next.

MARKET REPORTS.

London,—December 8, 1903. Messrs. KEARTON, PIPER & Co., THE WEST INDIA COMMITTEE CIRCULAR; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR', December 4; and 'THE PUBLIC LEDGER,' December 5, 1903.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* to 1⅞*d.*; Bermuda, 1/3 to 1/8 per lb.
BALATA—1/9 to 2/3 per lb.
BEES'-WAX—£7 10*s.* to £7 15*s.* per cwt.
CACAO—Trinidad, 63/- to 70/- per cwt.; Jamaica, 48/6 to 63/- per cwt.; Grenada, 53/- to 62/ per cwt.; other islands, 51/- to 53/-.
CARDAMOMS—Mysore, 7*d.* to 3/2 per lb.
COFFEE—Jamaica, ordinary, 34/- to 55/- per cwt.
COPRA—Trinidad, £15 15*s.* to £16 per ton, c.i.f.
COTTON—West Indian, 6⅝*d.* per lb.
DIVI DIVI—No quotations.
FRUIT—
BANANAS—Jamaica, 7/- to 9/- per bunch.
GRAPE FRUIT—12/- to 13/- per case.
ORANGES—Jamaica, 9/- to 12/- per case.
PINE-APPLES—No quotations.
FUSTIC—No quotations.
GINGER—Jamaica, 36/- to 55/- per cwt.
HONEY—Jamaica, 19/- to 28/6 per cwt.
ISINGLASS—West Indian lump, 2/3 to 2/10; Cake, 1/3 to 1/7 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 10*d.* to 1/2 per gallon; Concentrated, £12 15*s.* per cask of 108 gallons.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—1/10 to 2/6 per lb.
NITRATE OF SODA—Agricultural, £10 per ton.
NUTMEGS—62's, 2/4; 75's, 1/10; 85's, 1/7 per lb.
PIMENTO—3⅞*d.* to 4*d.* per lb.
RUM—Demerara, 9*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
SARSAPARILLA—Jamaica, 10*d.* to 1/1 per lb.
SUGAR—Crystallized, 15/3 to 16/6 per cwt.; Molasses Sugar—in demand, 11/6 to 15/-.
SULPHATE OF AMMONIA—£12 5*s.* per ton.
TAMARINDS—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—December 1, 1903.—'THE MARITIME MERCHANT.'

MOLASSES—Porto Rico, 41c. to 44c.; Barbados, 38c. to 39c. per gallon.

New York,—November 27, 1903.—Messrs. GILLESPIE BROS. & Co.

BANANAS—No quotations.
CACAO—African, 12c. to 12½c.; Caracas, 14c. to 15c.; Jamaica, 10½c. to 12½c.; Grenada, 12¾c. to 13c.; Trinidad, 13¾c. to 14½c. per lb.
COCOA-NUTS—Trinidads, $18·00 to $20·00; Jamaicas, $22·00 to $24·00 per M. selected.
COFFEE—Jamaica, fair to good ordinary, 6c. to 7¼c. per lb.; Manchester grades, 8½c. to 10½c. per lb.
GINGER—Jamaica, 7¾c. to 8¼c. per lb.
GOAT SKINS—Jamaicas, 50c. to 53½c. per lb.
GRAPE FRUIT—$3·50 to $6·00 per barrel.
ORANGES—$3·25 to $3·75 per barrel.
PIMENTO—7¾c. to 8c. per lb., ex store.
RUBBER—No quotations.
SUGAR—Centrifugals, 96°, 3¾c.; Muscovados, 89°, 3¼c.; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 19, 1903.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·75 per 100 lb.
CACAO—$10·00 to $11·00 per 100 lb.
COCOA-NUTS—$9·00 per M. (husked nuts).
COFFEE—Jamaica and ordinary Rio, $8·00 and $9·50 per 100 lb. respectively.
HAY—$1·25 per 100 lb.
MANURES—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00; Sulphate of potash, $67·00; Sheep Manure, $6·25 per ton.
MOLASSES—No quotations.
ONIONS—$3·25 per 100 lb.
POTATOS, ENGLISH—$1·70 to $2·40 per 100 lb.
RICE—Ballam, $4·95 per bag (190 lb.); Patna $3·75 per 100 lb.; Rangoon, $3·00 per 100 lb.
SUGAR—No quotations.

British Guiana,—December 17, 1903.—Messrs. WEITING & RICHTER.

ARROWROOT—St. Vincent, $8·75 to $9·00 per barrel.
BALATA—40c. to 42c. per lb.
CACAO—Native, 11c. to 12c. per lb.
CASSAVA STARCH—$5·00 to $5·50 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 11c. to 12c. per lb. (retail).
—Creole, 11c. to 12c. per lb.
DHAL—New, $3·35; Old, $3·10 per bag of 168 lb.
EDDOES—$1·20 per barrel.
MOLASSES—Vacuum Pan yellow, 15c. per gallon, casks included.
ONIONS—Madeira, 2½c. per lb. ex store; Garlic, 6c. to 7c.
PEA NUTS—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—$2·50 to $4·00 per barrel.
RICE—Ballam, $4·60 per 177 lb., ex store; Creole 18c. to 20c. per gallon (retail).
SWEET POTATOS—Barbados, $1·44 per barrel.
TANNIAS—$2·40 per bag.
YAMS—White, $1·68 per bag.
SUGAR—Dark Crystals, $1·82 to $1·85; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00 to $5·00 per M.

Trinidad,—December 17, 1903.—Messrs. GORDON, GRANT & Co., and Messrs. EDGAR TRIPP & Co.

BALATA—Venezuelan, 38½c. per lb.
CACAO—Ordinary, $13·25 to $13·50; Estates, $14·25 to $14·50 per fanega.
COCOA-NUTS—$16·00 per M. f.o.b., selected in bags of 100.
COCOA-NUT MEAL—1¼c. per lb.
COCOA-NUT OIL—55c. per Imperial Gallon (casks included).
COFFEE—Venezuelan, 6½c. per lb.
COPRA—$2·40 to $2·50 per 100 lb.
ONIONS—$3·50 per 100 lb.
POTATOS, ENGLISH—$1·25 to $1·30 per 100 lb.
RICE—Yellow, $4·25 to $4·50; White Table, $5·50 to $5·75 per bag.
SUGAR—No quotations.

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A FORTNIGHTLY REVIEW

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VOL. III. No. 46. BARBADOS, JANUARY 16, 1904. PRICE 1*d.*

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Barbados and Porto Rico Molasses.

IN Pamphlet No. 28, just issued by this Department, planters and others are placed in possession of information relating to molasses and syrup. The greater part of the pamphlet is devoted to the report of the Imperial Commissioner and Mr. Bovell containing information obtained in New York and elsewhere as to the trade in molasses. A brief summary of this report has already been given in the *Agricultural News* (Vol. II, p. 387).

It has for some time been felt that something should be done to improve the quality of Barbados molasses. In a letter to the Imperial Commissioner of Agriculture, dated September 7 last, the Barbados Committee of Commerce made the suggestion that it would be to the advantage of all concerned if Sir Daniel Morris and Mr. Bovell were able, while on a visit to the United States, to obtain information as to the relative value of Barbados and Porto Rico molasses, the quality of the packages and other matters connected with the trade in this product. It was also suggested that they might visit Porto Rico for the purpose of ascertaining whether there is adopted in that island any particular method of manufacture which might be the cause of Porto Rico molasses being accorded preference in the United States and Canadian markets. Information was also desired as to grading and shipping of molasses in Porto Rico.

It was intended that Mr. Bovell should return to the United States by way of Porto Rico for the purpose of making inquiries on the spot. As however it was ascertained that the time was not a suitable one for the purpose on account of the crop season being over, this plan was abandoned.

As has already been stated, it was found possible to obtain in New York and elsewhere valuable information which is summarized in a handy form in the pamphlet referred to for the use of planters and others interested in the matter.

A careful perusal of the report will indicate the lines upon which an improvement in the quality of Barbados molasses might be made. The exports of molasses from Barbados during the past three years have been as follows: 1901, 46,043 puncheons, valued at £143,884; 1902, 42,760 puncheons, valued at £119, 728; and 1903, 30,177 puncheons, valued at £105,303.

Barbados molasses, it was ascertained, would appear to correspond with the intermediate grade of Porto Rico molasses, known as 'Choice', although the latter is of a decidedly better colour. Porto Rico 'Fancy,' which is the highest grade, realized in New York last year 7c. per gallon more than the Barbados article. Nearly all of the 'Fancy' molasses is used in the eastern part of the United States, none going to Canada: on the other hand, Porto Rico 'Choice' and Barbados molasses nearly all go to Canada.

In the matter of packages, it was ascertained that the hogsheads and puncheons are in some cases smaller and nearly always of a better quality than those used in Barbados. There appears to be a tendency for buyers of molasses to prefer barrels to hogsheads and puncheons for the reason that the latter when empty are practically unsaleable. It would be well if shippers were to note these points as well as the objection made to the method of fastening the Barbados hogsheads. Here the ends of the wooden hoops on the puncheons are placed together and wound with rope-yarn; in Porto Rico the hoops are locked. The Barbados fastening does not appear to be sufficiently strong: the plan of locking the hoops might perhaps be substituted.

It is evident that sulphuring the cane juice and also the packages would be advantageous both in giving a better colour to the molasses and in preventing the acidity, which was stated in New York to be an undesirable feature of Barbados molasses. Sulphuring the barrels has been found by Dr. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, to be very successful. Syrup so treated kept for many months although the barrel was opened several times for samples to be withdrawn.

It would also appear necessary that greater attention should be paid to grading, as this would assist in improving the prospects of good prices. A suggestion is offered that a few trial shipments should be made of syrup, similar to that sent from Ruby estate last season. It must be noted that it is not proposed that syrup should be shipped on a large scale but only after it has been established that syrup would pay better than sugar. There would of course be a danger of serious competition arising, in which the Barbados syrup would not have the particular advantages enjoyed by the molasses produced in this island.

It is hoped that planters and merchants, being placed in possession of information as to the requirements of the market, will make an earnest effort to bring about such improvement in the general character of Barbados molasses as will lead to a demand for it at figures not below those obtained for the best qualities produced in other countries.

Exactly similar remarks apply to the molasses shipped at Antigua and St. Kitt's and indeed to all localities where muscovado sugar is made. At Jamaica little or no molasses is exported. It is there entirely utilized in the manufacture of rum.

SUGAR INDUSTRY.

Barbados Molasses.

The following extract from the *Louisiana Planter* of December 5, 1903, may be of interest as bearing on the question of improving the quality of Barbados molasses, which has of late occupied so much attention in this island:—

We think that what is the matter with Barbados is what is occurring everywhere in the sugar world. The encroachment of corn syrups or glucose upon the market for liquid sweets is felt everywhere, and it has practically destroyed the Louisiana molasses trade, and we presume that its influence is now reaching the sugar planters of Barbados. Good, wholesome, plantation molasses is one of the best food articles known, and it is a pity that the chemically prepared corn glucose should seem to be crowding it out of existence.

Porto Rico Molasses.

Mr. Consul Churchward's Report on the *Trade and Commerce of Porto Rico* for the year 1902, recently issued by the Foreign Office as No. 3,027 of the Diplomatic and Consular Reports, contains references to the island's trade in molasses which are of considerable interest:—

The total value of the exports of molasses during the year was £70,860 as against £63,324 for the previous year—an increase of nearly 12 per cent. Mr. Vice-consul Toro states that in the Ponce district, 'there are no less than sixteen plantations, some of them large ones, which yet make only muscovado sugars, thus the large export of molasses, which amounted this year to 2,766,170 gallons, valued at £69,995.'

The Vice-consul for Mayaguez reports that 640,807 gallons of molasses were exported, of which no fewer than thirteen cargoes were in British bottoms for British North America.

In the report of the Vice-consul at Arroya de Quayama, it is stated that the principal exports are sugar, molasses, cigars, bay rum, and essence of bay. The report continues: 'As all these articles were free of duties in the United States of America, the difference in price is so enormous that they cannot be exported to other countries, except in the case of molasses, which in spite of entering free of duty into the United States, nearly all that is made in this district is exported to the Dominion of Canada, 395,645 gallons, of the value of £12,812, being sent to that country during the past year.'

It is further shown that of the £70,860 worth of molasses exported from Porto Rico during the year, £65,937 worth (or over 93 per cent.) went to Canada.

Improvement of the Sugar-cane by Chemical Selection.

The following abstract of a paper published by Dr. J. D. Kobus in the *Annales du Jardin Botanique de Buitenzorg*, is taken from the *Journal of the Royal Horticultural Society* for October. It gives a concise summary of the main features of Dr. Kobus' investigation on the subject of the raising of improved varieties of sugar-cane by vegetative reproduction:—

This laborious and detailed paper on the 'Chemical Selection of the Sugar-cane' is worthy of close study by every breeder of plants, for it gives an account of an attempt to produce by cuttings a race of sugar-cane that should display an increased vigour by an increased yield of sugar and by an increased power of resisting (sereh-) disease. The conclusions drawn obviously have a very important bearing upon cultivated herbs that are propagated vegetatively rather than by seeds.

The conclusions arrived at may be summarized as follows:—

1. The amount of sugar in the individual stems of one sugar plant was apt to vary greatly. The author selected for propagation plants that exhibited small variations, and he suggests that greater success might attend analogous attempts at improvement in the [English] potato were more attention paid to the amount of starch in the whole of the tubers rather than in individual tubers.

2. The variability of the amount of sugar in the different varieties was greatest in thick-stemmed varieties that had long been in cultivation, and least in young ones more recently selected from seed.

3. The amount of sugar in the cane varied directly with the weight of the same.

4. Heavy plants gave rise to heavy offspring. The same character has been shown in reference to the potato.

5. The descendants of plants rich in sugar were richer in sugar and heavier than unselected plants.

6. But the simple selection of cuttings of heavy plants did not lead to the production of forms markedly richer in sugar, though the resulting plants were in general richer in sugar. Indeed, heavy plants poor in sugar seemed to have a much worse effect on the amount of sugar in the progeny than did light plants poor in sugar.

7. Extreme care had to be exercised in the selection of the ground on which the experiments were made; for even on an apparently uniform soil great differences were apt to appear in the individual plants merely in consequence of local variations in the soil.

8. A most important discovery was made, namely, that the increased vigour as reflected in the larger yield of sugar was accompanied by greater immunity from the sereh-disease.

TAMWORTH PIGS IN TRINIDAD.

The following notes on the results obtained with Tamworth pigs at the Government Farm, Trinidad, forwarded by Mr. C. W. Meaden, the Manager, are of interest. It is evident from the financial statement that the experiment has been a success and that this class of pig is suited to West Indian conditions, when careful attention is paid to management:—

These pigs seem to have adapted themselves to the climate of Trinidad, having withstood the test for three years. They are hardy, free from any kind of disease, good breeders, and the sows are careful of their young. No particular process of feeding has been adopted, anything usually produced in the way of garden produce being given cooked. They are comfortably housed in concrete styes with litter. They are fed at 6 a.m., exercised till 10 a.m., bathed and given a feed of Para grass and various wild vines, and fed again at 4 p.m. With this treatment this class of pig will keep in reasonable growing condition, and at twelve months should produce 150 lb. of good, firm pork, the lean and fat being well distributed. Judging from particulars which have been received from purchasers of the young pigs, the introduction may be said to have been satisfactory. In their management it must be remembered that as these pigs are pure bred, they should receive rather more care than is usually given to the common native animal, especially in their early days. So far as can be learned, the crossing with the common sow has given favourable results. Experiments conducted in Canada have shown that crosses between the Berkshire and the Tamworth have given the best results so far as the production of the most suitable bacon for export is concerned. The combination has been appreciated in the bacon market, as the meat produced shows the happy medium of lean and fat which is so much favoured for the breakfast table.

The following is the financial record of the experiment for the year:—

Revenue:			
72 pigs sold at $3·00 per head	$216·00		
5 ,, transferred to Tobago Farm at $3·00	15·00		
Service of boar to 13 sows at $1·00	13·00		
		$244·00	
Expenditure:			
Attendant at $8·00 per month	$96·00		
Cost of food for six pigs at 3c. per day	65·70		
		$161·70	
Profit			$82·30

The register showed for the year eighty-four births from five sows. Of these seventy-two were sold, five transferred and seven died.

WEST INDIAN FRUIT.

PICKING AND PACKING ORANGES FOR EXPORT.

The subject of curing oranges has already been dealt with in an article in the *Agricultural News* (Vol. II, p. 101), where great stress was laid on the necessity of drying the fruit before packing, so that the entrance of fungi may be prevented. It is also pointed out that the fruit must be so picked and packed as to prevent bruising.

In an article on the cultivation of oranges in *Industrial Trinidad*, the writer, Mr. H. Caracciolo, states that success in the orange industry mainly depends on the picking and packing, and gives the following directions for shippers to which we would direct careful attention :—

Oranges should be picked with a fruit picker. This consists of a pole to which is attached a shear, under which is hung a net-work bag to receive the fruit.

They should be collected when full and before getting yellow, care being taken in clipping the stems to leave a small portion on the orange.

They must then be spread in an open and airy shed and left there for two or three days (depending on the weather) to dry, but they must not be sundried.

This process is adopted to drive away any extra moisture from the rind.

They will then be wrapped in tissue paper, packed tightly but not squeezed, as one orange that may get damaged will very soon rot and spoil the whole box, the last operation being to cart to port. This should be done on springs as the jerking experienced by our system of carts will knock them about too much and cause much damage. It is also advisable to let fruits arrive at port on the day of shipment to avoid unnecessary handling. Fruits should be shipped to arrive in England from July to October, but August and September are preferable, and to the United States from September to February.

In conclusion, I strongly recommend this business to my fellow colonists who will find it very remunerative ; we must not be intimidated by failures in the beginning, for nothing is attained without experiencing some difficulty and disappointment at first, but when these have been overcome, one will then look with satisfaction at the prospects that will be in store. I have had that experience already and paid dearly for it ; but given those shipping facilities, the rest is in our hands, and the day will come when we shall recognize its benefits.

BANANAS FROM SIERRA LEONE.

In reference to a specimen bunch of bananas shipped from Sierra Leone to London, a prominent fruit merchant in Covent Garden market writes :—

It is a small bunch in a chilled condition and so discoloured as to be unsaleable and unusable. In fact, it is a very poor sample of the same variety that is coming from Jamaica and Costa Rica, and which, if in good condition, is worth only 5*s*. to 7*s*. per bunch ; while the Canary Islands fruit is worth double, weight for weight, if in good condition.

It might be mentioned that the bananas that are so successfully being shipped from Barbados are identical with those shipped from the Canary Islands and fetch similar prices.

PRISON FARM AT JAMAICA.

Several references have been made in the *Agricultural News* to the success which has attended the establishment of the farm at the Spanish Town prison in Jamaica. The following interesting report on the cultivation is taken from the December issue of the *Journal of the Jamaica Agricultural Society* :—

It is now a year since the first operations were commenced at the Prison Farm, Spanish Town, and a visit to the place now will show that it is really a model cultivation. There are 10 acres under bananas, planted 16 by 16 feet, promising to begin shooting in January ; $3\frac{3}{4}$ acres of different varieties of rice, just ripening in magnificent condition ; 3 acres of sweet and bitter cassava, including the best known local varieties, and some seedling varieties ; 12 acres of sweet potatos, providing a succession of roots for use in the prison ; 1 acre of cotton giving an exceptionally heavy bearing, something like ten times the average, and coming in at the best time—during the dry months of January and February ; an acre of pumpkins, yielding a heavy weekly supply ; 3 acres of yams, just bearing ; an acre of corn ; 1 acre Guinea corn, $\frac{1}{2}$ acre of peas, patches of peppers, kallaloo, ochros, and $\frac{1}{2}$ acre of kitchen garden, growing tomatos, egg-plants, turnips, carrots, cabbage, kohl-rabi, potatos, etc. The cultivation has paid its way, and is likely to do more. The laying out of the ground has been done with excellent judgement and skill, the irrigation system is economical and effective, and the water can be laid on at any place at any time, while the drainage system is complete and effective.

COTTON.

Cotton at Montserrat.

We extract the following information on the cultivation of cotton at Montserrat from papers by his Honour F. H. Watkins, the Commissioner, and Mr. A. J. Jordan, the Agricultural Instructor, in the *West Indian Bulletin*, Vol. IV, pp. 231-5. Mr. Watkins states that he is indebted for most of the results given in his paper to Mr. C. Watson, of Dagenham, and Mr. Jordan :—

As to the character of the land specially suited to cotton, it has been found that soils of a light gravelly nature are the best adapted to its growth, an average of 1,000 lb. of seed-cotton per acre having been obtained as against a yield of 600 lb. from heavier soils.

Encouragement in the shape of free distribution of good, reliable seed has been given to the owners of suitable lands by the local government and the British Cotton Growing Association of Oldham. Of all the varieties of seed the Sea Island is decidedly the favourite, for it has given the best results both in quantity and in the length of the fibre. There is, moreover, a good demand for long-stapled cotton both in America and in England.

For the crop of 1903-4 it is estimated that nearly 700 acres will be planted. The time for planting is in June and July, or August at the latest. The seeds are planted three to a hole, about 6 to 12 lb. per acre, in 4 feet rows and 16 inches apart. Some planters advocate 2 feet by 3 feet.

The period for reaping extends from the middle of November to May, and on an average, 1,000 lb. of seed-cotton were obtained from an acre. After ginning, the proportion of seed was as 7,163 lb. of seed to 2,837 lb. of lint in 10,000 lb. of seed-cotton or, roughly speaking, 7 to 3. A woman—and picking cotton is work eminently suited for women and children—after a little practice, can pick 40 to 50 lb. of seed-cotton in a day, that is, an acre in twenty to twenty-five days: in other words, twenty to twenty-five women could pick an acre in a day. Care should be taken to pick the cotton in dry weather. Whether it will be of advantage to ratoon the crop, is a question to be decided by further experience. The minimum price obtained has been 10*d.* per lb., and a maximum of 1*s.* 1½*d.* per lb. has been obtained. The cotton industry has come most opportunely and may enable the island to tide over, in a measure, a serious crisis in its agricultural history.

COST OF CULTIVATION.

Most of the land planted in cotton last season was previously in cane, but in one instance some new land was cleared of bush. The bush was first cut and burnt, the debris ranged in lines with a hoe and the cotton seed planted in between the lines. The cost of cultivation was given to me as follows:—

	£	s.	d.
Cutting and burning per acre ...	1	0	0
Ranging „ „ ...		4	0
Planting „ „ ...		1	6
Three weedings @ 1*s.* 2*d.* per acre ...		3	6
Picking 1,000 lb. @ 1*s.* per 100 lb. ...		10	0
	1	19	0

In the case of land planted with cotton after cane, the work was much less. The cane stumps were dug out and the trash ranged in the furrows. The banks were then forked or grubbed over with a subsoil plough and the seeds planted. Three weedings were given during growth. The cost of cultivation was as follows :—

	£	s.	d.
Digging out cane stumps per acre ...		2	6
Ranging trash „ „ ...		2	0
Forking banks „ „ ...		4	3
Planting seed „ „ ...		1	0
Three weedings @ 1*s.* 2*d.* „ „ ...		3	6
Picking cotton @ 1*s.* per 100 lb. ...		10	0
	1	3	3

When the plough was used instead of the fork, the cost of ploughing per acre was about 3*s.*

The first weeding is generally given as soon as the plants are well above the ground, and the second and third weedings at intervals of from two to three weeks, and by the time the last weeding has been given the plants are almost meeting across the rows.

Cotton Seed Cake.

The *Farmer and Stock-breeder*, of November 16, publishes a report on the adulteration of manures and feeding stuffs, submitted by the Consulting Chemist to the last meeting of the Council of the Royal Agricultural Society of England. In this report Dr. Voelcker draws attention to the adulteration of Egyptian cotton seed cake :—

There is good reason to believe that admixture of Bombay cotton seed with Egyptian-grown seed goes on extensively, the product being sold as 'Egyptian cotton seed cake', and at the price of the latter. As the Bombay seed, on account of the presence of an excess of cotton wool and of its inferior quality, is more than £1 per ton cheaper than the Egyptian seed, there is considerable margin for profit in this admixture, which is really an adulteration. Purchasers are advised to stipulate in their contracts for 'pure Egyptian cotton seed cake,' and to see that cotton seed cake sold to them is so described on the invoice sent.

Machine for Cutting Guinea Grass, etc. The Hon'ble Lieutenant-Colonel A. H. Pinnock writes in the November issue of the *Journal of the Jamaica Agricultural Society* on the utility of horse-power mowing machines for cutting Guinea grass and cleaning commons. The writer has had in use for eighteen months a 'Deering Ideal One-horse Mower,' and during that time it has cut over 100 acres of grass and commons without requiring any expenditure whatever for repairs. The cost of this machine landed in Jamaica was £10 10*s.* Colonel Pinnock has found it advisable to attach to it a false shoe by means of which the knife is kept 3 to 5 inches, as required, above the level of the ground. This attachment protects the knife from injury by stumps, etc. It is estimated that with one big horse or a pair of small mules, the machine can cut an acre of Guinea grass in half an hour. This machine has also been found to give most satisfactory results when used for cleaning pastures and commons. Eight to ten acres per day would be a reasonable task for a man and two mules.

BEE-KEEPING.

West Indian Honey.

We extract the following from an article in the *Canadian Grocer* of December 4 :—

Jamaica and Trinidad are the two islands producing the largest amount of honey. Jamaica has now attained the position of an exporting country, whereas Trinidad consumes all it produces. The industry of bee-keeping in Trinidad is on the increase, and before long that island will become a shipping centre. The variety of bees that is found to be a success is the Italian bee, and all colonies that are being developed are from these strains. The best honey is produced during the months of January to the end of May, that is during the period of the dry season. It is during the dry season that a large majority of trees are in flower, and owing to the dryness of the atmosphere, the saccharine cells in the flowers are most highly developed. During the other portion of the year the production of honey is much smaller owing to the lack of flowers and to the necessity of having to feed the bees with molasses and sugar. Honey produced during this period is of much poorer flavour than that produced during the early six months of the year.

In St. Lucia bee-keeping and the honey industry is being pushed forward energetically and systematically by Mr. G. S. Hudson, the Agricultural Instructor, whose first sales in London brought 20*s.* per cwt. c.i.f. This honey was very favourably reported upon by the brokers, and though produced at the period when the West Indian hog plum tree was in flower, which tree produces one of the worst flavoured honeys, the quality of the honey, irrespective of the flavour, was of good standard.

The colour of the West Indian honey is very much darker than that of our domestic white clover honey; it is more of the character of buckwheat, though without this latter grade's peculiar flavour. It is also very much stronger, and such honey as has been received in Montreal has been taken by the large biscuit manufacturers for its stronger and more penetrating characteristics. During the past season one Montreal biscuit and confectionery company bought over a carload. In the West Indies, as well, it is used in the manufacture of goods where sugar would have a tendency to ferment, and undoubtedly for a similar reason Canadian manufacturers find use for it. It is mixed with lime juice in the islands and this prevents fermentation and derangement of the stomach. As regards the prospect of trade with Canada there is no reason why good business should not result, though the greatest difficulty in the way of a regular and steady trade would seem to lie in the fact that the Canadian consumer has for so long been accustomed to using the distinctively rich, white clover, Canadian honey, and the stronger West Indian honey taste would require cultivation. Still as a product for use by manufacturers the field is open in Canada, and with its stronger and more fermenting characteristics it should find ready sale.

The duty on honey coming into Canada is 3c. per lb., but on West Indian honey coming in under the British preferential tariff would be $\frac{1}{3}$c. less, or 2c. per lb.

NOTES ON WATERING.

Carelessness in the matter of watering is often the cause of failure in the garden. The following extract from an article on watering in *Indian Planting and Gardening* of November 21, 1903, gives suggestions which might well be adopted :—

One of the commonest mistakes is that of merely moistening the surface of the earth. If we casually glance at the work of our mali, it appears to be all right, but by removing a little of the top earth we find, in many cases, that the soil underneath is quite dry, the water never having reached the lower roots ; this is the cause of a large number of failures with our plants. When watering is necessary, let it be done thoroughly. Never water hard-baked earth ; first loosen the soil to a depth of 4 or 5 inches, then give a copious supply of water. Always keep the surface soil loose ; this will lessen the evaporation, and prevent the soil from baking and cracking. All watering, or as much as possible, should be done late in the afternoon. Water for many gardens has to be brought from a distance ; in these cases it ought to be carried in the daytime, kept in tanks or barrels, and applied as late as it can conveniently be done in the afternoon. When watering cannot be done in the afternoon, let the work be performed the first thing in the morning ; never, if it can possibly be helped, when the sun is shining. For all vegetable gardens we recommend the laying on of a mulch of manure, straw or some such material to prevent the rapid evaporation of moisture from the soil. It would serve the same purpose in our compounds, but looks unsightly, and ought to be used only when there is a scarcity of water. Fruit trees and shrubs are also greatly benefited by a mulching of good stable manure ; never apply it thicker than 3 inches ; if too thick a coat be given, it is apt to interfere with the free percolation of the air through the soil. It is preferable to use rain or pond water as long as it is procurable. All liquid manures should be saved from the cow-sheds and stables ; this should be diluted with clean water before being used. Never give manure water to plants that are suffering from drought ; first give clean water, then, after the plants have revived, apply liquid manure. The majority of plants in the vegetable garden, when well established, will be greatly benefited by frequent applications of liquid manure.

SUNFLOWERS AND BEES.

Writing in the August issue of the *Journal of the Jamaica Agricultural Society*, Dr. James Neish gives an interesting account of his experience in the cultivation of sunflowers. Referring to the general complaint of those who have grown this useful plant in the West Indies but have so often failed to make it produce seed, Dr. Neish confirms the opinion of the Director of Public Gardens and Plantations in Jamaica, that the want of success in this particular is due to the absence of bees in the locality where sunflowers are grown. Dr. Neish goes on to say :—

At Old Harbour there are two extensive apiaries, and there is no lack of bees in this neighbourhood. When the sunflowers bloomed, it was interesting to notice the remarkable attention which the bees paid to them, as many as sixteen bees having been counted on one flower-head. The result has naturally been a full development of well-grown seeds, which are available for reproducing the crop. Under our tropical influences, the sunflower grows rapidly, and the cultivator will not have long to wait for a return.

LECTURES TO PLANTERS AT BARBADOS.

The following is a summary of Mr. Lewton-Brain's third lecture on Sugar-cane diseases :—

The root disease of the sugar-cane has probably caused more damage, during the past few years, than all other sugar-cane diseases together. It appears to attack equally well all varieties of cane at present in cultivation and yields to no fungicidal treatment. The fungus attacks ratoons more frequently than it does plant canes. The leaves first show signs of the disease ; instead of a dozen or so broad, bright green leaves, we get them drying up much earlier than they should do. The drying up takes place first at the tip and edges of the leaves and gradually spreads until the whole leaf is dry and withered. The younger leaves, before they even begin to turn yellow, do not open out as they should do ; they remain partially rolled up. Evidently the plant is suffering from the lack of water. The leaves farthest from the main axis, and first the parts of them which are farthest removed, are drying up and dying, while the younger leaves which are still receiving a certain amount of water roll up to reduce the water lost by the process of transpiration.

The old dry leaf-sheaths, which in a healthy plant are thrown off leaving the base of the stem clean, remain attached and require considerable force to remove them. On examination we find that they are all matted together, by a clean looking, white felt which is the mycelium of the fungus *Marasmius*. The matted leaf bases have a characteristic musty smell. The roots normally spring from the nodes, burst through the leaf bases and then grow down into the soil. Either these do not develop at all or their growth ceases when they are about $\frac{1}{4}$ or $\frac{1}{2}$ inch long.

The canes attacked by the root fungus are usually considerably dwarfed in comparison with others in the same field ; not only are fewer leaves developed, but the stems are much thinner and drier and usually shorter than normal canes. Again the diseased canes are very easily uprooted, the slightest pull being sufficient to remove the stool.

Finally from the bases of the stools or from the roots arise the fruits of the fungus. These are small, white or yellowish toadstools, and we usually find them in groups. They are rarely to be found except in wet weather, and the best time to look for them is in the early morning before the sun has dried them up. These fruits bear the spores.

Under natural conditions the spores are shed at the base of the cane plant and are thence carried away either by wind or insects. Each spore is capable, if conditions be favourable, of infecting a cane plant with root disease. If one of these spores be carried by the wind and get on a cane plant, it will, in all probability, fall on one of the leaf-sheaths and will lodge somewhere between the sheath and the stem. The chances are that the spore will germinate and soon give rise to a mycelium, which at first grows in, and obtains its nourishment from, the dead and dying tissues of the leaf-sheaths. It passes from one of these to another and by its dense matted habit of growth, binds them altogether into a musty smelling mass. In a similar way the fungus spreads to any dead or dying part of the plant above or below ground.

The mycelium then proceeds to attack the growing region of the root which is composed of a number of very delicate thin-walled cells, full of protoplasm. The fungus does no other damage and attacks no other part of the plant ; it simply enters the tissues of the growing points and destroys them. This is the cause of the dark colour of the root-tips which I mentioned as one of the symptoms of root disease. But this is quite enough to affect seriously the growth and nourishment of the cane.

As roots die away and are not replaced by others, the water and mineral salts from the soil are absorbed in gradually decreasing quantities, consequently the leaves are unable to manufacture so much of the sugar and proteid substances, which are required for use during growth.

The first sign of the disease is due to the cutting off of a part of the water supply. The effect on the plant is the same as that of excessive drought. The leaves under these conditions roll up in order to lessen the loss of water by transpiration, and with plants infected with root disease this condition becomes more or less permanent. This prevents them from taking in the full amount of gases from the air. In this way the food supplies of the plant are attacked at both ends, at the roots and the leaves, and this at a time, it must be remembered, when the plant requires more food than usual in order to replace the roots which are being killed off by the fungus.

The fungus has now established itself on its host. The latter gradually becomes weaker and weaker, owing to the process of slow starvation. The stunted habit of the plant is due to its inability to form new organs, owing to lack of nourishment ; while the ease with which the plant is uprooted is due to the non-development of roots, which are the anchoring as well as the absorbing organs of the plant.

Later on in the year, usually during the wet season, the fungus proceeds to reproduce itself. This it does by putting out the small toadstools, on which the spores are borne. The toadstools usually grow out near the ground, either from dead roots or from the trash at the base of the stem.

The cane does not of course always succumb to the attack of the fungus in this manner. The fungus will establish itself, as before, on the old leaf-sheaths and other dead parts and be ready to attack the roots. But a plant cane growing vigorously and under favourable conditions will be able to form new roots so abundantly and so fast that the attack of the fungus produces little effect on it. The same thing of course may happen after the fungus has commenced to do damage, if the conditions change and become such as favour root development.

The fungus is also spread by the mycelium travelling underground. Any old cane stump or piece of trash is a sufficient source of nourishment for the mycelium. If then any infected stump is brought near a growing cane, the mycelium passes from one to another.

We must, in every possible way, increase the vigour of the canes. A cane growing vigorously is not likely to be damaged, seriously, by the root fungus. The soil should therefore be cultivated as thoroughly as possible, so as to give the roots the best chance of developing, and at the same time to weaken the fungus. When only a small patch in a field is attacked and the disease is noticed in time, this area should be isolated from the rest of the field to prevent the fungus spreading by its mycelium underground. This can be done by digging a trench around the area.

Then we have the disposal of infected material. All cane stumps infested with the *Marasmius* mycelium should, if possible, be burnt, otherwise they may be mixed with lime and buried, but not in a cane field. Trash from infested fields should not be used in cane fields, nor should it be made into pen manure which is to be applied to canes. It may be used on land which is to be planted in cotton or in any other crop which is not liable to root disease.

Again land which has borne a badly attacked crop of canes should not be planted in cane till the fungus has been starved out. Cotton offers itself as a remunerative crop, which might be grown in rotation with sugar-cane.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 15 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

VOL. III. SATURDAY, JANUARY 16, 1904. No. 46.

NOTES AND COMMENTS.

Agricultural Education.

At the recent Assizes held at Barbados, the Grand Jury, in their reply to the address of the Chief Justice, referred in the following terms to the efforts now being made to extend agricultural education and bring the rising generation into sympathy with agricultural pursuits:—

We embrace this opportunity to express our appreciation of the efforts of the Imperial Department of Agriculture in trying to imbue the minds of the young that to follow the calling of an agricultural labourer is not derogatory, and we venture to assert that, if the Department is successful in this direction, in a few years there will be further ground for congratulation.

Barbados Local Exhibition.

The fourth annual Local Industrial Exhibition and Show of Stock for Peasant Proprietors, under the auspices of the Imperial Department of Agriculture, was held at Lower Estate, St. Michael's, on Tuesday, January 12.

These local shows are organized mainly for peasant proprietors, for the purpose of encouraging the better selection and cultivation of fruit, vegetables, etc. With this object over 200 money prizes were offered for competition by the Imperial Commissioner of Agriculture. Five diplomas of merit of the Imperial Department of Agriculture were awarded in various competitions.

A more detailed report of the exhibition will be given in the next issue of the *Agricultural News*.

Ontario Crop Report.

The *Crop Bulletin* just issued by the Ontario Department of Agriculture, gives statistics and general information relating to the crops of Ontario for 1903.

The condition of the tobacco crop at harvesting was reported as from fair to good; the cool, wet summer kept growth back, but the fine, early autumn was most favourable. Beets, of which a good yield was reported, appear to be growing in favour as a food for live stock. The honey crop was good except in a few districts where the weather was unfavourable.

Fibre of Agave americana.

Reference was made in the *Agricultural News*, Vol. II, p. 393, to the uses of the agaves, and to the production of a drink, known as 'Pulque,' from the century plant (*Agave americana*). Fibre is also obtained from this plant and a sample, obtained from Assam, was recently examined at the Imperial Institute. A report on this fibre is given in the *Imperial Institute Bulletin*, No. 3. The report of the brokers to whom the samples were submitted was as follows: 'Of good quality but rather too dry and brittle; its strength, colour and length are all described as fairly satisfactory. Portions of the samples are of good quality, being equal to ordinary sisal hemp from the West Indies and would realize about the same price, which ranges at the present time from £35 to £38 per ton.' While it is pointed out that this price is exceptionally high, a trial shipment of a few tons was recommended.

Cotton Pests at Antigua.

In a recent report Mr. W. N. Sands, Curator of the Antigua Botanic Station, gives an interesting account of efforts directed against the cotton caterpillar and other pests that have appeared in the cotton cultivations during the past season.

Experiments were conducted to ascertain the most effective proportions in which Paris green should be used. Spraying with Paris green in water was found of little avail and dusting was then resorted to. When mixed with lime, 1 lb. of Paris green to 6 lb. of lime gave the best results. This insecticide was also tried mixed with flour and with plaster of Paris, but in neither case were the results as good as when the Paris green was mixed with lime. The flour caused the Paris green to adhere to the leaves better but was very difficult to apply. A mixture of 1 lb. of Paris green and 6 lb. of lime was usually sufficient to dust ½ to 1 acre.

Hand-picking of the caterpillars does not appear to be practical on a large scale, although good results are recorded where hand-picking of the pupae was practised.

On one estate the cotton cultivation had been kept free from insects by the use of flocks of turkeys and chickens.

It would appear from this report that the cotton worm can effectively be kept in check when Paris green is used with care and judgement *immediately* on appearance of the pest.

Agriculture in Lagos.

The *Annual Colonial Report on Lagos* for 1902 contains a review of the agricultural position of the colony during the year.

A model farm has been started at Oloke Meji with the object of promoting the cultivation of tropical products that can be grown in the colony and protectorate. With the assistance of the British Cotton Growing Association the cultivation of cotton has been embarked upon, several thousand acres having been planted out. Cotton was an established industry in the past, as shown by the fact that in 1869 the value of the cotton exported was £79,957. Of recent years the natives have grown merely sufficient for home use.

As a result of the appointment of a European Produce Inspector, the quality of the palm kernels shipped has been improved, the profits and the prices realized being higher than for many years. A very satisfactory state of affairs in the mahogany trade is reported, African wood being in great demand both in England and in America.

The trade in cacao was not satisfactory: although Lagos cacao is of good quality, sufficient attention is not paid to curing. Of trade generally the Collector of Customs reports: 'The year was one of the best the colony has ever experienced as regards both imports and exports.'

Shade Trees and Manures for Cacao.

It may be of interest to record the following results of experiments, relating to shade trees and manures for cacao, conducted at Trinidad, Dominica and St. Lucia.

The general experience with Immortel trees is that on poor soils these trees do not supply sufficient nitrogen for the cacao, and an application of some nitrogenous manure is advisable. In Trinidad, 2½ cwt. to 3 cwt. of either sulphate of ammonia or nitrate of soda have given good results. Shade trees are not usually grown with cacao in Dominica on account of the damage done to the cacao by the falling of such trees as the Immortel or the Saman. The use of *Castilloa elastica* is advocated by the Curator for this purpose on account of its withstanding gales better.

With regard to the application of fertilizers, the large amounts of nitrate of soda and sulphate of ammonia, suggested by the Botanic Department at Trinidad, are not considered necessary either in Dominica or St. Lucia. As the result of trials in the latter island Mr. Hudson recommends the application of 1 cwt. of nitrate of soda (costing 15*s*.) or 1 cwt of sulphate of ammonia (containing 20 to 24 per cent. of ammonia) at a cost of 17*s*.

Basic slag has been found to give the best results as a phosphatic manure for cacao. For St. Lucia an application of 8 cwt. to 10 cwt. is recommended. Much smaller quantities appear to be used in Trinidad.

Potash is supplied in Trinidad in the form of sulphate of potash (3 cwt. per acre) or wood-ashes (7 cwt.); in St. Lucia the application of potash does not, as a general rule, appear to be necessary.

Lectures to Planters at Barbados.

The third and concluding lecture of the course of lectures to planters on Sugar-cane diseases was delivered by Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, on Friday, January 8. A summary of the lecture is given on page 23 of this issue.

The full text of the three lectures will shortly be issued as No. 29 of the Pamphlet series.

Notes on Balata.

The *India-rubber Journal* of December 7, 1903, contains an interesting article on balata by Mr. H. L. Terry, F.I.C. As a considerable amount of misconception exists as to the nature and uses of this substance, and there is a common tendency to regard it as identical both with gutta-percha and with India-rubber, we give the following brief summary of Mr. Terry's article:—

Balata and India-rubber are entirely distinct bodies both as regards their origin and physical characters and also in the uses to which they are applied.

With regard to balata and gutta-percha, however, it is impossible in the present state of chemical knowledge, to say that they are fundamentally different. Many of their properties are the same. Botanically they are quite distinct: balata is the product of *Mimusops globosa*, occurring pretty generally in Trinidad, the Guianas and Venezuela; while the gutta-percha tree is *Dichopsis Gutta* (found in the Malay Archipelago).

Although it is commonly stated that balata is employed as an insulating material, the writer is of opinion that its use for deep sea work is practically nil. What is known with tolerable exactitude is the destination, other than cable works, of the London imports of balata, and when these various purchases are added up, it is seen that there is not much left for employment in the electrical industry. Moreover, the fact that the market price of balata has not risen in consonance with the great rise that has taken place in that of gutta-percha, would seem to indicate that balata cannot replace gutta-percha for electrical work. It seems fairly safe to assume that balata has very small application, if any, for insulating purposes. No doubt its defects are largely due to the amount of resinous matter that it contains, 40 to 50 per cent. being often found in the better quality, compared with 20 per cent. in the best gutta-percha.

Like India-rubber and gutta-percha, balata is obtained as a milky exudation on the incision of the tree; the very wasteful method of cutting down the tree instead of tapping it being the procedure generally in vogue. The milk has to be coagulated in order to separate the valuable substance from the water in which it is disseminated. This is done either by boiling the sap in kettles until it is of a doughy consistency, this on exposure to air soon solidifying to a block; or by drying the milky fluid gradually in shallow pans exposed to the sun's rays.

INSECT NOTES.

The Cotton Worm.

Several references have been made in recent issues of the *Agricultural News* to the cotton worm which has proved a troublesome pest to cotton in Barbados and elsewhere in the West Indies. In the present issue we reproduce from the *West Indian Bulletin*, (Vol. IV, pp. 269-71) extracts from Mr. Ballou's account of the life-history of this pest. It will be seen that probably three to four days are occupied in the egg stage, that the larval stage takes from one to three weeks, while the insect remains in a dormant state for about a fortnight, the whole generation taking between three and six weeks:—

The egg: The egg is laid upon the under side of the younger leaves near the top of the plant. Each female moth lays a large number of eggs which are generally scattered and rarely, if ever, in clusters. The egg is pale green in colour and quite easily distinguished upon the surface of the leaf. Seen from above, the egg presents a circular outline, but viewed from the side it appears rather elliptical, or as if flattened from above. If it be examined with a pocket lens, its surface will be seen to be marked with fine lines or ridges radiating from the centre above. The duration of the egg stage in midsummer in the United States is given as three to four days, and in cooler weather slightly longer.

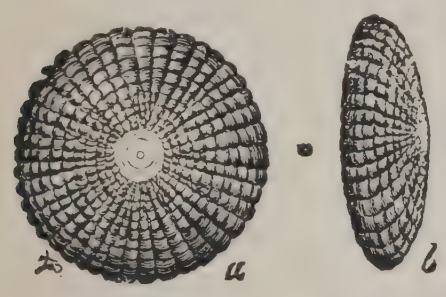


Fig. 2. Egg of *Aletia argillacea*, greatly enlarged: *a*, dorsal; *b*, side view.

The larva: When the young caterpillar first leaves the shell, it is very small and not easily seen, so nearly is it of the colour of the under surface of the leaf, where it remains a short time and begins feeding. At first it does not eat the tissue of the leaf clean but merely gnaws away the under surface which is much more tender than the thicker upper surface. As it grows older it eats the entire tissue of the leaf except only the largest veins. This insect is one of the 'loopers' or 'measuring worms.' These names are given because the larva travels by arching its body and bringing up its hind legs to the forward ones and then reaching out again to get a new hold with the forward pairs. This peculiarity is shown even in the earliest stages. The development of the caterpillar requires from one to three weeks, and during this period the skin is shed five times. When first hatched, the larva is yellowish in colour but soon becomes greenish with numerous black spots and yellowish longitudinal lines. The fully-grown larva measures nearly $1\frac{1}{2}$ inches and is quite slender. The head is dull olive-green; a very fine bluish-white line extends along the middle of the back the entire length of the body. On either side of this fine line is a wider green line; each of these being, in turn, bordered by a yellow band. There are two rows of black spots along the back—one row in each of the yellow bands—each of the black spots has a fine stiff hair or bristle arising from its centre, and careful examination will show a fine white ring outside the black of each spot.

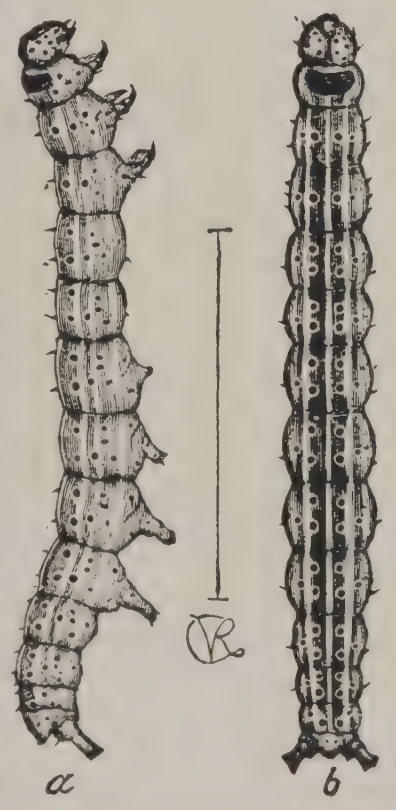


Fig. 3. COTTON WORM. Larva of *Aletia argillacea*, enlarged; actual length indicated by hair line. *a*, side; *b*, dorsal view.

The sides are olive-green with several more or less interrupted lighter lines running lengthwise, the lower one being continuous. There are black spots on the sides also, which are like those on the back except that they are smaller, and are not arranged in regular rows. There is much variation in the colour of the larvae at different seasons of the year, the earlier broods being lighter and the later ones darker.

The pupa: When the caterpillar is fully grown, it spins a thin, scant cocoon inside which it pupates. The cocoon usually consists of a few whitish, silken threads, which hold the pupa on the under side of the leaf, the edge of the leaf being frequently slightly rolled or drawn under. The pupa is at first greenish, but soon becomes dark-brown. It is a little more than $\frac{1}{2}$ inch in length.

One week to thirty days is the length of time given for the pupa stage in the United States. Probably in the West Indies the time of pupation will not extend over more than two weeks on account of the uniformly warm weather.

The adult insect: The adult or winged insect of the cotton caterpillar is a small greyish moth with a spread of wings from $1\frac{1}{8}$ to $1\frac{1}{2}$ inches. There are several fine, wavy, dark lines running across the forewings, and one or two small bluish-white spots in each forewing toward the front.

The moth is a night-flyer, hiding by day, and when disturbed, flying with short, swift darts. At night it flies out to feed and lays its eggs. Egg-laying begins a few days after the female leaves the chrysalis and each female lays a large number of eggs—300 to 500. Many moths are unable to feed, others merely suck the juices of flowers and fruit; but this one has a peculiar proboscis with which it is able to pierce the skin and tissues of ripe fruits, etc., upon which it feeds. It also feeds upon the nectar of flowers, etc.

FIG. 4. Adult of *Aletia argillacea: a*, wings spread; *b*, wings folded, natural resting position.

Further experimental work is still necessary to show how many broods there are in the West Indies, and at what times they appear; but it is probable that breeding continues all the year round, and that the larger numbers at certain times or seasons are due to the increased amount of cotton available at those times. Five broods are known to occur each year in the United States.

The eyes are dark, velvety-brown, large and prominent. Palpi are large and are directed forward and upward in front of the eyes. Between the eyes the long, slender proboscis is coiled up like a watch spring. The antennae are a light, yellowish-grey, long and slender and composed of a large number of small segments.

EDUCATIONAL.

Agricultural Schools.

The usual half-yearly examinations were held at the Agricultural Schools at Dominica, St. Lucia and St. Vincent in December last. The following are the general reports of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.), from which it will be seen that the results are, on the whole, of a satisfactory character:—

DOMINICA.

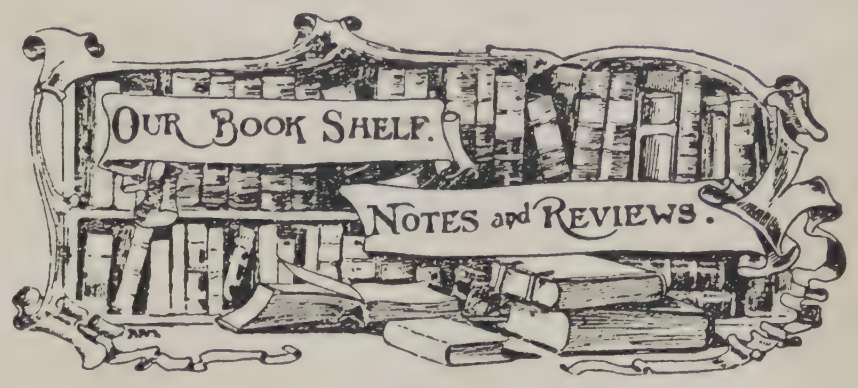
The papers, on the whole, are fairly satisfactory, especially those of the senior class. Both classes have sent in weak papers in Chemistry and the juniors also in Arithmetic and Geography. Great watchfulness is needed to prevent the boys' knowledge being merely a matter of memory; they must be taught, if possible, to think and reason. Great care should be taken, in performing experiments, that every boy sees and understands every detail. The average of marks is not high, owing to the fact that, in most subjects, all the boys fail, more or less, to answer one particular question, as is noted in the separate reports on the different subjects. Among the seniors, Elwin, Winston and Serrant have done fairly well. There is not much to choose between the others. Watty is the only one who has totalled less than 50 per cent. Among the juniors, Josse and Bruney are well above the others. Bellot, Gachette and La Rocque are all considerably under 50 per cent.

ST. LUCIA.

The new syllabus has now been in force for only a few months, consequently the results, as was to be expected, are not so entirely satisfactory as they were under the old syllabus. There seems a tendency, especially in the Chemistry and Botany, for the work to be too bookish. This should be carefully guarded against and the work in these sciences should be taught in close connexion not only with the experimental work in the class room, but also with the practical work in the School gardens. The papers in Agriculture are the most satisfactory. There seems some confusion in the grouping of the boys into two classes; some of them have done the senior papers in one subject and the junior in others; consequently the arrangement of the boys in order of merit is hardly possible. Goring has again done very well, and Allahdua, Edgar, du Boulay and Flavien, fairly so. Pedriel is the only boy who has less than 50 per cent. of the total marks.

ST. VINCENT.

The two new boys, Falby and Henderson, have done very little: it is to be hoped that they will show considerable improvement at the next examination. Apart from them, the junior boys have not done well; in nearly every subject their answers are comparatively of less value than those of the senior boys. The seniors have done very well, on the whole; their answers show that the subjects have been taught in a practical manner and that they have seen and understood the experiments described. None of the juniors should be promoted to the senior class. Among the seniors, Glasgow and Derrick have sent in excellent papers all through. Derrick has beaten Glasgow on account of his arithmetic paper; in the other subjects Glasgow is better or equal. None of the seniors have obtained less than 50 per cent. of the total marks; Browne and Warner are near it. Among the juniors, Durrant is the best. Longheed and Rankin have both totalled less than 50 per cent.



HINTS ON OUTFIT FOR TRAVELLERS IN TROPICAL COUNTRIES: By C. F. Harford, M.A., M.D., Principal of Livingstone College, Editor of *Climate*, and Instructor in Health and Outfit to the Royal Geographical Society. *London: The Royal Geographical Society, 1, Saville Row, W., 1903.*

The special object of this little handbook is to answer some of the questions that present themselves to intending travellers. While it is quite impossible to lay down rules that will meet all cases, there are, as stated in the introduction, 'certain general principles which should guide the intending traveller in the selection of his equipment, which are dealt with in succeeding pages.'

Chapter V dealing with Mosquito Protection is especially worthy of consideration. Information is given as to mosquito nets, mosquito boots and other methods of protection.

While this book is not written so much for the use of persons visiting well-organized communities, such as are found in the West Indies, as for those joining exploring expeditions and the like, yet it contains much useful information which should be of assistance to travellers in any tropical country.

DISEASES OF THE HORSE: A special report of the Bureau of Animal Industry, United States Department of Agriculture. *Washington: Government Printing Office, 1903.*

This is a new and revised edition of a report first issued in 1890, the limited edition of which was very soon exhausted. An entirely new article on 'The examination of a horse', by the State Veterinarian of Pennsylvania, is included, as well as a chapter on horse-shoeing, by Dr. J. W. Adams, Professor of Surgery in the Veterinary Department of the University of Pennsylvania.

The report has been prepared by a number of the foremost men in the veterinary profession in the United States, and may, therefore, be regarded as the work of specialists in the various branches of the subject. It forms a safe and reliable guide for horse owners in the treatment of the diseases of the horse, the want of which has long been felt not only in the United States but also in Great Britain and the colonies.

This volume has been prepared for the special use of the farmer, and will be found to be free, for the most part, from technical terms and expressions, and to be written in a more or less popular style.

Horse owners will, no doubt, find the chapters on the diseases of the foot and horse-shoeing particularly useful in enabling them to adopt humane and scientific treatment of the horse's foot, and to prevent the unnecessary suffering so often brought about by careless or unscientific shoeing.

The volume is well illustrated throughout, containing some forty excellent plates in addition to a number of smaller figures.

GLEANINGS.

The Maltese Jenny lately imported into Antigua has given birth to a fine young Jack which is in thriving condition.

The death of the pure-bred Short-horn Bull at the Skerrett's Farm, Antigua, was reported in the *Agricultural News* (Vol. II, p. 108). We learn that a fine bull calf, obtained from this animal, is now a month old and weighs 115 lb. A second bull calf from the same animal is being reared on a private plantation.

The *Transvaal Agricultural Journal* suggests the following for destroying fowl lice:—'Put a little plug tobacco in some hot water. Let the solution stand overnight in a covered vessel, and then spray all over the body. Repeat in a week if necessary.'

The *India-rubber Journal* of December 21, 1903, has the following note on West Indian rubber:—'Trinidad exported 35,442 lb. of balata, worth £2,888, in 1902. In the same year, British Honduras exported rubber to the value of $14,163, while Cuba imported rubber goods to the value of $134,995, as against $148,398, in 1901'.

About the middle of December last the Diamond plantation in British Guiana completed a record crop of 12,525 tons of sugar. Among the seedling canes under cultivation are 600 acres of Barbados cane, 208. Over the whole of the crop it is stated that 'the seedling canes have averaged considerably more sugar per acre than the Bourbon cane.'

In the *Colonial Report on the British Solomon Islands* for 1902-3, it is stated that the area under cultivation of cocoa-nuts at the Tulagi Station has been increased from 105 to 135 acres. Many young cocoa-nut trees, of from three and a half to four years old, are showing signs of blossom and nuts, and young trees upwards of four years old are producing a return. The trees are planted 33 feet apart, giving forty to the acre. The growth has been so vigorous that in the older part of the plantation the leaves of adjoining trees overlap.

A correspondent, writing in the October issue of the *Agricultural Journal of the Cape of Good Hope*, describes a simple preventive for ticks. A large herd of goats had suffered considerably from an attack of ticks, when the writer conceived the idea of trying the effect of the wild garlic plant. The remaining goats each received two of these bulbs, with the result that the ticks fell from the animals, which were not again attacked. It appears that oil of garlic is a strong germicide, permeating the whole system when eaten in quantity.

The following notice, signed by the Hon'ble C. A. Shand, of Nevis, appeared in the *St. Christopher Advertiser* of December 22, 1903:—

'Cotton growers are warned against separating the cotton seeds from the lint by hand, as hand-picked cotton is very inferior to that ginned by machinery owing to the uneven staple resulting from the former process.'

According to the *Board of Trade Journal* attention is drawn in the report for 1902 of the Rotterdam Chamber of Commerce to the use of cocoa-nut oil in the margarine industry. Since the attempts to neutralize this oil—rendering it all but scentless and flavourless—proved successful, its consumption greatly increased. It is stated that the use of this fat is open to no objection as a constituent of margarine on account of its fairly high nutritive value. It is imported into Rotterdam from Marseilles, London and elsewhere under a variety of names, such as cocosine, vegetaline, etc.

The *Annual Colonial Report on Barbados* for 1902 has the following reference to the establishment of a cotton industry in the island:—'A large supply of seed has been imported and distributed free of cost to planters, and it is estimated that some 1,200 acres, capable of yielding about 300,000 lb. of clean cotton, will shortly be under cultivation. The advantage of the industry to the colony lies in the fact that the cotton can be grown on land that is unsuitable for the sugar-cane, and its introduction will not, therefore, displace sugar cultivation to any great extent.'

Referring to the 'canker' which has made its appearance on rubber trees in Ceylon, the *India-rubber World* says: 'It would be strange if the acclimatization of the *Hevea* in Asia should be unaccompanied by some malady to which it has not been known to be subject in America. The transference of some other economic plants from their native habitat has developed in them unfavourable conditions, which in time have been remedied by science, and this very fact should prevent the complete discouragement of the Ceylon rubber planters at the first indication of any troubles with their trees.'

The *Gardeners' Chronicle* of December 19, 1903, has the following reference to the cultivation of ginger in the Central African Protectorate:—

'This product is giving great promise of being worthy of extensive cultivation. The climate is eminently suitable. As 40*s.* may be reckoned on as about the average London price per cwt., it ought to be largely grown. Propagation is an easy matter, and it has been proved that from one crown it is possible to obtain over twenty good strong shoots in a year; and it is estimated that it is possible to get a half pound of ginger from each plant in the same period.'

The *Colonial Report on Ceylon* for 1902 states:—'Para rubber is rapidly taking its place as one of the most important of the cultivations of the island, and has been planted up in various climates at different elevations, but will be found no doubt most profitable at the lower elevations. During the year some 25,000 seeds have been distributed from the trees in the Henaratgoda Garden. Good yields have been obtained, and the best methods of getting rid of the water and preparing the "biscuits" for the market are beginning to be understood and practised. Prices have been kept up to a high figure, over 4*s.* having been obtained for a large quantity.'

BARBADOS AND PORTO RICO MOLASSES. Pamphlet Series, No. 28.

This pamphlet contains correspondence relating to the inquiry conducted by Sir Daniel Morris and Mr. J. R. Bovell on the subject of Barbados and Porto Rico molasses and their report embodying the results of the inquiry.

A clear statement is given of the relative merits of Barbados and Porto Rico molasses, and the preparation of the latter for market is described. It is considered that the quality of Barbados molasses might be improved by the adoption of some of the methods practised in Porto Rico.

A brief summary of the report together with the recommendations made by Sir Daniel Morris and Mr. Bovell, has already appeared in the *Agricultural News* (Vol. II, p. 387). A more complete review of this pamphlet together with a general statement of the position of affairs in connexion with this inquiry will be found on pp. 17 and 18 of the present issue.

BRITISH GUIANA: REPORT OF THE BOARD OF AGRICULTURE, 1901-3. By Professor J. B. Harrison, C.M.G., M.A., Deputy Chairman.

This report gives an account of the work of the Board from its inception, in July 1901, to March 31, 1903. During this period eight general meetings have been held; the greater part of the Board's business is conducted by circulating papers—a plan which admits of matters being disposed at the meetings with little expenditure of time and discussion.

The following are the Standing Committees:—Finance and Executive, Stock, Library, Exhibition, Agricultural Education, Sugar-cane Experiments, and Subsidiary Products. We have already given in the *Agricultural News*, from time to time, extracts from reports on the sugar-cane experiments and on the efforts that have been made to promote agricultural instruction in the colony, by means of school gardens, agricultural shows, etc.

Special attention is drawn in the report to the work performed by the Stock Committee: 'In accordance with the recommendations of the committee, two half-bred Guernsey bulls were imported from Trinidad, two Plymouth Rock cocks and twelve hens of the same kind from Canada, while at the end of the financial year orders were in course of execution in Canada for a thoroughbred Short-horn bull, a Holstein bull and three Holstein cows, and in Trinidad for thoroughbred Berkshire pigs. This committee will doubtless in course of time find its work greatly increased. There is perhaps no subsidiary industry in this colony of greater promise than that of raising stock on the very extensive pasture lands of the littoral, and later, perhaps, on some of the Berbice savannahs.'

Similar accounts are given of the work performed by the other committees, which bear evidence of the usefulness of this recently-formed Board. There can be no doubt that this work, so well inaugurated, will have far-reaching effect on the agricultural progress of the colony.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture arrived at Antigua on Saturday, January 2. A meeting of planters was held at Government House on Wednesday, January 6. The Governor, Sir Gerald Strickland, presided. Sir Daniel Morris gave an address embodying some of the results of his recent visit to the United States; and the Hon'ble Francis Watts laid before the meeting an outline of the scheme for advancing money to cotton growers during the coming season. Particulars of this scheme will be published later. The Commissioner of Agriculture returned to Barbados on January 9.

We regret to announce the death, on January 3, of Mr. William Lunt, Curator of the Botanic Station and Agricultural Superintendent of Sugar-cane Experiments at St. Kitt's. The occurrence is deeply regretted by all classes of the community.

Mr. Henry A. Ballou, B.Sc., has been occupied in the investigation of cotton diseases at Montserrat. The 'mite' pest has caused some damage especially on the western slopes of the island. Mr. Ballou is expected to return on January 16.

Mr. W. B. Seabrook, the expert ginner from the Sea Islands of South Carolina, whose services have been engaged by the Imperial Department of Agriculture, arrived at Barbados in S.S. 'Fluminense' on the 13th. instant.

THE USE OF CARBON BISULPHIDE AS AN INSECTICIDE.

We reprinted on p. 397 of the *Agricultural News* (Vol. II) a pamphlet, prepared by Mr. H. H. Cousins, giving instructions as to the use of carbon bisulphide as an insecticide. The editor of the *Journal of the Jamaica Agricultural Society* gives the following additional notes as to its use for certain purposes:—

Destroying stinging ants attacking pine-apples and orange trees by finding their nests, pouring a little of the liquid in the hills or in the holes and fling some earth over. Even when the ants had their nests around the roots of the orange trees, the application of the bisulphide did not harm the roots.

Where orange trees had leaves turning yellow, and attacks by grubs at the roots were suspected, four holes were bored down, 2 feet from the tree (closer in very young trees) and about a tablespoonful poured in each of the holes, quickly covering with some earth instantly.

Barrels of corn and peas were protected from attacks by weevils, and these insects destroyed where they already existed, by pouring a teaspoonful of bisulphide into a little tobacco tin (or any other like utensil) placed on the top of the cover, a sack flung over and the lid of the barrel jammed down tight on the sack.

The drawback to the free use of bisulphide in orange groves where the grubs of the Fidler Beetle were attacking the roots of the trees, was the expense of buying it, 3*s.* 6*d.* for a jar holding a little less than a quart. Now that the Chemist holds a supply at so cheap a rate as 4*d.* a lb., this stuff ought to come into general use.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London Drug and Spice Market during the months of October and November has been contributed by Mr. J. R. Jackson, A.L.S. The last report (for September) of this series will be found in the *Agricultural News*, Vol. II, p. 366:—

In the unavoidable absence from the *Agricultural News* of my notes on the London drug and spice sales during October last it will not be necessary, at this period, to review in detail the markets of that month, except where they have a bearing upon the sales of the month of November now under review, or in the case of a few special articles.

Thus in the early part of October good West Indian kola nuts sold at 6*d.* for good, bold bright, nine bags being disposed of at this date; while a barrel of good sold at 5¾*d.*, and some odd packages of mouldy and damaged fetched prices ranging from 4¼*d.* to 4¾*d.* per ℔. These prices varied slightly during the remainder of the month, the quotations at the sale on the 14th. being as follows: for good bright, 5½*d.*; fair, 5*d.* to 5¼*d.*, and mouldy, 2*d.* to 2¾*d.*

Sarsaparilla at the first sale in October sold at prices ranging from 9*d.* for damaged Jamaica to 1*s.* 1*d.*; while some 28 bales badly sea-damaged and mouldy Lima Jamaica sold at 3½*d.*

On October 14, over 300 barrels of manufacturing St. Vincent arrowroot was sold at 2*d.*, and 50 tons at 3½*d.*

GINGER.

The demand for ginger during the month was never very great. At the sale on the 7th. fair, washed, rough Cochin was quoted at 30*s.*, and slightly mouldy cuttings at 26*s.* Of 277 barrels of Jamaica offered, only four sold at 52*s.* 6*d.* for good middling.

At the first sale in November no Jamaica ginger was offered and there was little or no demand for the article of any grade; 386 bags of Cochin were offered and bought in at 34*s.* for good, washed rough, and 30*s.* for good cuttings. In addition to this, 53 cases of small cut were also offered and bought in at 45*s.* The market remained practically in the same dull condition throughout the month, and at the last auction Cochin ginger was quoted at much lower prices, about 1,000 bags being bought in; 58 barrels of Jamaica were offered and 40 sold at 38*s.* to 39*s.* 6*d.* for ordinary dullish, and 43*s.* for medium dullish.

SARSAPARILLA.

The dealings in sarsaparilla during November may be thus stated. In the middle of the month fair Lima Jamaica was sold at steady rates, fair selling at 10*d.* per ℔. Grey Jamaica was scarce, one bale offered being bought in at 1*s.* 4*d.* Two bales of mixed, red and pale, native Jamaica, realized 11*d.* per ℔., and a bale of pale yellow 8½*d.*; while for good brands of Honduras, 1*s.* 1*d.* to 1*s.* 2*d.* was paid. At the last sale of the month 45 bales of grey Jamaica were offered and sold at 1*s.* to 1*s.* 1*d.* for fair rolled fibrous, and 10*d.* to 11½*d.* for coarse and partly country damaged, sea-damaged fetching 9*d.* Eight bales of native Jamaica were offered and bought in.

KOLA.

Of kola nuts four bags of good, red West Indian were sold at the mid-month's sale at 4½*d.*, and for three packages of good small to medium, 4*d.* to 4¾*d.* was paid, mouldy fetching 3*d.* to 3½*d.*

ARROWROOT.

At the sale on the 12th., 100 barrels good manufactured St. Vincent arrowroot were disposed of at 2¾*d.*, while fine St. Vincent was bought in at 3*d.* to 4¾*d.*, and good at 2⅛*d.* Bermuda was also bought in at 1*s.* 6*d.* per ℔. A week later 200 barrels of St. Vincent were offered at 1¾*d.* to 2*d.* per ℔. Nothing further in this article is reported up to the end of November.

MACE, NUTMEGS AND PIMENTO.

At the spice sales on the 17th., West Indian mace was realizing somewhat lower prices, pale selling at 2*s.* 4*d.*; fair, 2*s.* 1*d.* to 2*s.* 3*d.*; ordinary, 1*s.* 11*d.* to 2*s.*; and broken, 1*s.* 10*d.* to 1*s.* 11*d.* Fair to good Java at this sale was bought in at 2*s.* 5*d.* to 2*s.* 7*d.*

West Indian nutmegs were selling at rather cheaper rates but with a steady demand, 243 packages being disposed of. At the last sale of the month three barrels of West Indian nutmegs, 112's dark, fetched 11*d.*, no Penang or Singapore being offered.

Pimento was at this sale bought in at 4¼*d.* to 4⅜*d.*

CASSIA FISTULA, ANNATTO AND TAMARINDS.

The other items of interest at the end of the month are the following:—*Cassia Fistula:* nine baskets of very lean kind sold at 30*s.* per cwt. Annatto seed: of this article no other kind but fair Madras has been quoted and this sold readily at from 3¾*d.* to 4*d.* per ℔. Good Barbados tamarinds were disposed of at prices varying from 14*s.* 3*d.* to 14*s* 6*d* per cwt.

To sum up, the general tone that has prevailed throughout the month in the drug and spice markets may be described as inactive. The interest excited in October on the subject of Mr. Chamberlain's fiscal policy has as yet by no means subsided.

POULTRY.

Sulphuric Acid for Chicken Cholera.

The following information relating to chicken cholera which originally appeared in *L'Union Pharmaceutique*, is taken from the *Pharmaceutical Journal* of November 28, 1903:—

Some poultry keepers are aware that the occasional addition of a little sulphuric acid to the drinking water supplied to their fowls has a beneficial and tonic effect, although the fact does not appear to be generally known. A recent outbreak of chicken cholera in Bulgaria has enabled P. Bitscheff to demonstrate that it is a valuable remedy in that fatal disease, at the same time rendering immune the healthy fowls exposed to infection. The dose given is three parts of sulphuric acid in 1,000 of water. It is stated that this acid water should not be given for more than three days at a time, since it is said to cause the laying of 'soft eggs,' and to give rise to diarrhoea.

The editor of the *Pharmaceutical Journal* commenting on the above suggests the use of a solution of ferrous sulphate instead of sulphuric acid. One drachm to 40 fluid ounces has been found beneficial. When either this or the acid is used, the drinking vessel employed should be of earthenware and not of 'galvanized' iron.

MARKET REPORTS.

London,—December 22, 1903. Messrs. Kearton, Piper & Co., Messrs. E. A. De Pass & Co. and Messrs. J. Hales Caird & Co., 'The Liverpool Cotton Association Weekly Circular', December 11; and 'The Public Ledger,' December 19, 1903.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/6 to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/3 to 1/8 per lb.
Balata—1/8 to 2/3 per lb.
Bees'-wax—£7 10*s.* to £7 12*s.* 6*d.* per cwt.
Cacao—Trinidad, 64/- to 72/- per cwt.; Grenada, 53/- to 62/- per cwt.; Dominica, St. Lucia, Jamaica, 50/- to 60/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/2 per lb.
Coffee—Jamaica, ordinary, 35/- to 55/- per cwt.
Copra—Trinidad, £15 10*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/1 to 1/2 per lb.
Divi Divi—No quotations.
Fruit—
Bananas—Canary Islands, 8/- to 11/- per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 10/- per case.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 36/- to 55/- per cwt.
Honey—Jamaica, 19/- to 28/6 per cwt.
Isinglass—West Indian lump, 2/3 to 2/11; Cake, 1/3 to 1/7 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 10*d.* to 1*s.* 2*d.* per gallon; Concentrated, £12 15*s.* to £13 per cask of 108 gallons.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/10 to 2/7 per lb.
Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.
Nutmegs—69's to 60's, 2/- to 2/6; 90's to 80's, 1/2 to 1/6 per lb.
Pimento—3½*d.* to 4*d.* per lb.
Rum—Demerara, 9*d.* to 10*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—No quotations.
Sugar—Crystallized, 15/- to 16/9 per cwt.; Muscovado, 11/- to 14/6; Molasses Sugar, 11/9 to 16/3.
Sulphate of Ammonia—£12 7*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—December 1, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 44c.; Barbados, 38c. to 39c. per gallon.

New York,—December 11, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 11¾c. to 12¼c.; Caracas, 14c. to 15c.; Jamaica, 10½c. to 12c.; Grenada, 12½c. to 13c.; Trinidad, 14c. to 15c. per lb.
Cocoa-nuts—Trinidads, $18·00 to $20·00; Jamaicas, $22·00 to $24·00 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7c. to 8c. per lb.; Manchester grades, 9c. to 11c. per lb.
Ginger—Jamaica, 7¼c. to 8¼c. per lb.
Goat Skins—Jamaicas, 50c. to 53½c. per lb.
Grape Fruit—$5·00 to $8·00 per barrel.
Oranges—$3·00 to $3·50 per barrel.
Pimento—7¾c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3⅝c.; Muscovados, 89°, 3⅛c.; Molasses, 89°, 2 15/16c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 2, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$10·00 to $11·00 per 100 lb.
Cocoa-nuts—$9·00 per M. (husked nuts).
Coffee—Jamaica and ordinary Rio, $9·00 to $9·50 per 100 lb. respectively.
Hay—$1·25 per 100 lb.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00; Sheep Manure, $6·25 per ton (ex ship).
Molasses—No quotations.
Onions—$3·25 per 100 lb.
Potatos, English—$1·70 to $2·40 per 100 lb.
Rice—Ballam, $4·65 per bag (178 lb.); Patna $3·75 per 100 lb.; Rangoon, $3·00 per 100 lb.
Sugar—No quotations.

British Guiana,—December 31, 1903.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·50 to $9·00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$5·00 per barrel.
Cocoa-nuts—$11·00 to $12·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 11c. to 12c. per lb.
Dhal—New, $3·30 to $3·40; Old, $3·10 per bag of 168 lb.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.
Onions—2½c. to 3c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
Plantains—20c. to 60c. per bunch.
Potatos, English—$2·50 to $2·75 per barrel.
Rice—Ballam, $4·60 to $4·65 per 177 lb., ex store; Creole, 18c. to 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·68 per barrel.
Tannias—$2·40 per bag.
Yams—White, $1·68 per bag.
Sugar—Dark Crystals, $1·82; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—December 31, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary, $13·00 to $13·25; Estates, $13·75 to $14·00 per fanega.
Cocoa-nuts—$16·00 per M. f.o.b., selected in bags of 100.
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—55c. per Imperial Gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·40 to $2·50 per 100 lb.
Onions—$3·50 per 100 lb.
Potatos, English—$1·16 to $1·20 per 100 lb.
Rice—Yellow, $4·25 to $4·50; White Table, $5·50 to $5·75 per bag.
Sugar—No quotations.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 47. BARBADOS, JANUARY 30, 1904. PRICE 1*d.*

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Trinidad Fruit Trade.

AT a meeting of the Trinidad Chamber of Commerce recently held at Port-of-Spain, an important discussion took place with regard to the establishment of a fruit industry.

Mr. Rust moved the following resolution: 'That this Chamber has watched with much interest the efforts of Mr. Symington's West Indian Syndicate to inaugurate and establish a fruit industry in this colony, and thinks that the time has now arrived when the Government might be approached with a view to financial assistance being granted to a syndicate in the shape of a grant-in-aid to defray the initial expenses the fruit syndicate had incurred, as the establishment of the fruit industry in Trinidad is a matter of great importance to the entire community.'

In introducing this resolution, Mr. Rust referred to the many attempts which had been made to inaugurate a fruit industry, but which had all ended in failure. He said that Mr. Symington had for several months past been indefatigable in his efforts to foster a fruit industry. Mr. Symington's syndicate had received fruit from the country, paying for it on the spot, and made shipments to England. Unfortunately, when sold in the English markets, the fruit did not cover the cost of purchase, packing and other expenses. To obtain a profit from uncultivated fruit was an impossibility. Any effort to be made in the direction of establishing a fruit trade should be promoted by the Government, for if they could get a fruit industry well started, they would be able to do as Jamaica had done, in raising an industry which brought hundreds of thousands of pounds to the colony every year.

He believed the Royal Mail Steamship Company was doing all it could to help and was most anxious to

see the industry developed. Mr. Symington's syndicate had done everything possible to educate the people to handle fruit, and although it would take some time, they had every hope of eventual success. He thought that the syndicate should get all possible support from the Chamber of Commerce and the Agricultural Society. In the initial steps it was inadvisable for Mr. Symington to reject any fruit sent in, and the consequence was that it had often been found that a good deal of it was unmarketable. The loss to the syndicate was about £2,200, which he (Mr. Rust) considered had been spent on the education of the people of Trinidad.

In supporting the motion, Mr. Tripp pointed out what the fruit trade had done for Jamaica. Ten or fifteen years ago Jamaica was almost in a state of bankruptcy, but the fruit industry was regarded as having practically saved that colony. The sugar industry had gone down, as it might in Trinidad; and if it did so, there was, he understood, only one industry that could take its place, namely, the fruit industry. He concluded by saying that the West India Committee had taken great interest in the matter and had passed a resolution that in the new mail contract the Government should insist on cool storage and facilities for conveying fruit being provided on both the ocean and intercolonial steamers.

A discussion followed which showed that the general feeling was that there were great possibilities for a fruit industry, provided it could be assisted through the initial stages. There was a great deal of fruit, formerly allowed to rot on the ground, that could now be utilized; but the people required to be educated as to the right kind of fruit to grow and how to ship it. It was impossible in the present position of affairs to exercise that rigid discrimination in selecting the fruit, that was necessary to ensure only sound fruit being shipped, as the growers had to be encouraged in every possible way. To put the industry on a satisfactory basis it needed the hearty co-operation of all concerned. In the result, the resolution proposed by Mr. Rust was unanimously carried.

We entirely sympathize with the efforts now being made to encourage a fruit trade between Trinidad and the United Kingdom by means of the Royal Mail or other steamers. It is probable, however, that at present there is not enough first class fruit (bananas and oranges) produced within easy distance of the railway and shipping ports to sustain a really large trade in these commodities. The first step would be to establish regular plantations as near as possible to the railway and shipping ports and so ensure not only that the fruit is being grown in large quantities, but also that it is capable of being delivered at a moderate cost on board the steamers at Port-of-Spain within, say, twenty-four hours after it is gathered from the trees. Again, it should be considered whether, when the plantations are fully established, a steamer once a fortnight will be sufficient to deal with the crop, as it steadily arrives at the shipping stage. In order to utilize all the fruit as it approaches maturity there should, in our opinion, be weekly, and not fortnightly, steamers, otherwise the growers may be left with a comparatively large portion of their produce without the means of shipping it. Further, it is realized that the existing Mail steamers are not suitable for carrying large quantities of perishable fruit. The present efforts of the Royal Mail Company are tentative only and carried on with the view of nursing the trade in its early stages. The necessary storage room with cooling apparatus for a regular trade in fruit can only be provided by steamers specially built for the purpose. It is understood that the Company is prepared, under certain conditions, to furnish such steamers; but the first of these conditions is an assurance that sufficient fruit is available at such times and under such circumstances, that it will pay the Company to incur the very considerable capital outlay in supplying commodious and fast-steaming fruit ships to meet the requirements not only of Trinidad, but of British Guiana, Grenada, St. Vincent, St. Lucia and Dominica, all of which might easily become large fruit-exporting centres. With regard to the shipment of fruit in crates from Barbados, this we hope to discuss later.

SUGAR INDUSTRY.

Sugar Industry in Jamaica.

The current number of the *Bulletin of the Department of Agriculture, Jamaica,* (Part 12, December 1902) contains a summary of the proceedings at the Conference of sugar planters held in that island on November 11 last.

In regard to the preference offered to West Indian sugars by the Government of the Dominion of Canada, Sir Daniel Morris is reported as follows :—

During his recent visit to the United States, he was told by those interested in West Indian sugar that the preference offered by Canada to the West Indies was not available under all circumstances. Quoting from a letter received on the subject by the Hon. the Colonial Secretary, Sir Daniel stated that, previous to the abolition of European

bounties, the preferential rebate offered by Canada to the West Indies of 33⅓ per cent. reduction in the duty was non-effective owing to the United States Government charging a countervailing duty equal to the amount of the bounty paid on European beet when exported, thereby enabling the United States refiners to pay proportionately a greater premium for West Indian and other cane sugars than the Canadian refiners could afford to do, as the amount of the bounty was greater than the preference in the Canadian tariff. Now that bounties had been abolished and all sugars were on an equality in the United States market, Jamaica sugar would not command the premium in New York, which it, along with other cane sugars, had done while bounty-fed beet had been subject to a countervailing duty on entering the States. Therefore, it is from now on that the Canadian preference should show itself, and that Canadian refiners should be willing to pay a higher price for West Indian sugars than can be obtained for them in other markets. The Canadian refiners would, of course, continue their efforts to secure British West Indian grown sugars at the same price, as the United States and United Kingdom refiners would be willing to pay for them, and take the benefit to themselves of the preferential rebate. So it rested with the sellers in the West Indies to enter into an agreement between themselves, whereby all shippers would refuse to sell to Canada unless a premium were paid in proof of the preference Canada offers to the West Indies, and which it was the intention of the Dominion Government should be given as an enhanced price to the West Indian planter for his sugar. An agreement might be arrived at that a fixed minimum premium be established at which sales are to be made to the Canadian refiners, either direct or through selling agents, either in New York, London or Canada, and that wherever possible an extra price over this minimum premium should be extracted from the Canadian buyer. Selling prices, of course, to be governed by what the Canadian refiners can buy other sugars at, but these buyers should at least be willing to pay half the amount of the preferential rebate in the Canadian tariff. The specific duty on sugar entering Canada, on raw sugar for a minimum polarization of 75° was 40 cents per 100 lb. advancing 1½ cents. per degree up to 100° paying 77½ cents. The duty on 89°, which is the basis of test for sale of muscovado, is 61 cents, from which the preference of 33⅓ per cent. to British grown sugar was 20·83 cents per 100 lb., and the duty on 96° test which was the basis for sale of centrifugal refining crystal sugar, is 71½ cents, the preference on this rate being 23·83 cents per 100 lb. There really is no reason why the Canadian refiners should not pay the whole of the preferential rebate, as an extra return on the purchased price to the West Indian grower. Otherwise the Canadian refiners would get their supplies of British West Indian sugar at nearly £1 per ton cheaper than anybody else, thereby increasing their own protection to that extent, at the expense of the West Indies.

Referring to the same subject, the Hon. Sydney Olivier, C.M.G., made the following observations:—

Another important question was that of the Canadian preference. According to information given to Sir D. Morris and himself, the whole of that preference was going into the pockets of the Canadian sugar refiners, and although Canada had received great credit for working in the interests of the Empire, the preferential arrangement was simply being run for the benefit of a few sugar refiners in Halifax, Montreal and elsewhere. The planters in Jamaica should make such arrangements as to secure their fair share of the preference.

West Indian Molasses in Canada.

The following information in regard to action taken by the Government of the Dominion of Canada to prevent the entry of molasses mixed with an appreciable percentage of glucose will be read with interest in these colonies.

The duty on molasses entering Canada is 1¾ cents per imperial gallon on all testing 40 per cent. of saccharose and upward, and 1 cent additional for each degree down to 35 per cent. In future, to prevent the admission of molasses mixed with glucose from the United States and other countries, it has been decided that any molasses or syrup, claimed to test less than 35 per cent. of saccharose, shall be liable to the syrup rate of duty, viz., ¾c. per *pound*, subject to a refund if the molasses is subsequently found to be pure.

The order issued by the Department of Customs at Ottawa, is as follows:—

In view of the frequent importation of molasses found to contain the admixture of glucose, it is ordered that ¾c. per lb. duty be collected on molasses entered at the Customs of Canada and claimed to test not less than 35 pending the test of polariscope at Customs in Ottawa, subject, however, to refund of duty if the molasses be subsequently found entitled to entry under tariff item 441. In case, however, of molasses imported direct to a Canadian port from the West Indies or Guiana, collector must allow delivery on payment of duty, under tariff item 441, upon importer's undertaking to amend entry, when so required, if the collector deems it advisable to do so, after examination of importation.

As stated in Pamphlet No. 28, *Barbados and Porto Rico Molasses* (p. 21), molasses from these islands contains on the average 52 per cent. of saccharose, the minimum being 47 per cent. and the maximum 56 per cent. The duty on molasses entering the United States containing less than 56 per cent. of saccharose is 3 cents per gallon, and on that containing 56 per cent. and upwards, it is 6 cents per gallon, wine measure.

Sugar Consumption in Canada.

The following note on the consumption of sugar in Canada, taken from the *Maritime Merchant* of December 31, 1903, is likely to be of considerable interest to planters in the West Indies:—

The steady increase in the consumption of sugar in Canada affords ground for hope that in the course of time this market will become much more valuable to the planters of the West Indies than it is to-day. For the fiscal year ending June 30, 1899, the total importation of sugar of all classes was 118,671 tons. In the year following, the importations increased to 136,011 tons, or 15 per cent. The importations in 1901 were 150,309 tons, an increase of 10 per cent. In 1902, we imported 165,211 tons, an increase of 10 per cent.; while in 1903, the consumption amounted to 174,397 tons, an increase of over 50 per cent. in five years. It is estimated that the consumption of sugars in Canada for the current year will reach 185,000 tons. At the present rate of increase, the consumption at the end of the next five years may be expected to exceed 250,000 tons.

WEST INDIAN FRUIT.

SEEDLESS LIMES.

The *Bulletin of the Botanical Department, Trinidad*, records the occurrence of a lime tree bearing seedless fruits. The following note is of interest:—

This has been brought to the notice of the Department by Mr. T. J. Potter, Warden of La Brea, and bud-wood was handed to Mr. Leslie, Senior Agricultural Instructor.

Buds have been taken and placed upon suitable stocks, and it is hoped soon to secure permanently this interesting addition to the fruits of Trinidad.

Fruits from the tree were examined and found to be of the ordinary size, character and flavour, but entirely seedless. Mr. Potter reports however, that in one instance he found a single seed in a fruit. The tree appears to be of vigorous growth, and likely to be well suited for cultivation in Trinidad. It has the habit and growth of an ordinary lime.

BARBADOS BANANAS.

Frequent reference has been made in these columns to the steady growth in the exports of Chinese or dwarf bananas from Barbados. These are identical with the Canary bananas and when shipped in good condition obtain encouraging prices. If this trade is to become established and prove remunerative to the growers, it will be necessary for them to make great efforts to produce first class fruit and pack it in the best possible condition.

The following extract, taken from the Barbados *Agricultural Reporter* of January 16, presents the subject in a practical form:—

Banana plots look vigorous except where they are crowded by potatos or other vegetables. Because some of us have not cleared from our banana exportations the extraordinary sums which were obtained in a few instances, they condemn this business as a failure. But we have been interested in some shipments and we have seen that, with attentive cultivation, cutting the fruit at the right stage, and packing carefully, more can be cleared from bananas than is now being cleared from sugar or anything else that we cultivate. Bananas require moisture and rich soil so as to give large bunches. Because good bunches may be got with little manure, it must not be understood that the fine bunches of twelve or thirteen hands, which really pay, can be obtained without some expenditure and trouble to enrich the soil.

COCOA-NUT PLANTING IN THE WEST INDIES.

The following letter from Messrs. Loders & Nucoline, Ltd. (Francis H. Loder, Managing Director,) Cairn Mills, Silvertown, London, dated January 5, 1904, has been received in reference to cocoa-nut planting and obtaining produce of the cocoa-nut palm from the West Indies. It would appear that there is a possibility of a considerable export trade in these products:—

We are interested in the produce of the cocoa-nut palm, being large buyers of cocoa-nut oil from Ceylon, and at the present time are considering the question of obtaining supplies from other quarters of the globe. The British West Indies have been suggested and Mr. Secretary Lyttleton has recommended us to communicate with you. We should esteem it a favour, if you would inform us whether the British West Indies present opportunities for the cultivation of cocoa-nut palms suitable for producing cocoa-nut oil of good quality, and whether such plantations are already in existence or if suitable land could be obtained for laying out plantations. Any further information on the subject of cocoa-nuts would be esteemed.

WEST INDIAN FERNS.

The following is a list of West Indian ferns, described by the late George S. Jenman, F.L.S., British Guiana, of which there are no specimens in the Herbarium of the Royal Gardens at Kew.

The Director would gladly welcome specimens of any of these for the Kew collections:—

Acrostichum kaieteurum.
Adiantum dissimulatum.
,, malaliense.
Aspidium Christianae.
Asplenium Harrisi.
,, Fawcetti.
,, oroupouchense.
,, Perkinsii.
,, duale.
Danaea nigrescens.
Davallia Sloanei.
Hymenophyllum kaieteurum.
Nephrodium negligens.
,, basiattenuatum.
,, nimbatum.
,, grenadense.
Nephrodium bibrachiatum.
,, dejectum.
,, Purdiaei.
Polypodium nigrescentium,
,, dendricolum.
,, mutatum.
,, nimbatum.
,, xiphopteroidoefolium.
,, kookenaamae.
,, Harrisi.
Pteris bulbifera.
,, inaequalis, Jenm. non Baker.
,, Harrisonae.
Trichomanes solitarium.

COTTON.

Cotton at Antigua.

A special meeting of the Agricultural and Commercial Society and persons interested in cotton growing was held at Government House on Wednesday, January 6, on the invitation of his Excellency Sir Gerald Strickland, K.C.M.G.

His Excellency in introducing Sir Daniel Morris, K.C.MG.., referred to the visit by the latter to the cotton-growing districts of the United States. The principal object of the meeting was to hear some of the information gathered by Sir Daniel on that visit.

Sir Daniel Morris, in addressing the meeting, expressed great pleasure in being afforded an opportunity of again meeting the planters of Antigua. He briefly reviewed the objects of his visit to the United States and discussed the question of the demand for Sea Island cotton and its market. 'Merchants and brokers have,' he stated, 'no fear of the market being overstocked and prices depreciating, provided that cotton of first class quality is produced.'

After Sir Daniel had dealt with the soil and methods of cultivation, picking, etc., observed in the United States, his Excellency asked Mr. Watts to explain the terms and arrangements to be made in connexion with the proposed cotton loans.

Mr. Watts stated that of the £5,000 available for loans in the Leeward Islands, £1,100 would be allotted for use in Antigua. Regulations will be formulated and published in a definite manner. As the loans have to be repaid, and as his Excellency had hinted at personal responsibility, strict business caution would have to be exercised in lending this money. A charge of 2 per cent. would be made to cover working expenses, and in addition, interest at the rate of 5 per cent. per annum : thus a person borrowing £100 for six months would have to pay £4 10*s*. 0*d*.

By way of security, a lien on the crop must be given which lien must take priority : besides this the borrower must obtain other security, preferably the guarantee of one or two substantial persons. There were difficulties in the way of taking land as security, and as far as possible this would be avoided. The money would be advanced in instalments (probably at the rate of 10*s*. per acre) up to an amount not exceeding £2 per acre. To obtain these loans applications should be addressed to himself (Mr. Watts) in the case of persons resident in Antigua. In the other Presidencies, applications should be made to the Administrator or Commissioner. It was advisable that those desirous of obtaining loans should apply in good time, stating the acreage it was proposed to cultivate in cotton and the security offered. Early application was desirable because the amount available was not unlimited, and it might be necessary to make some selection regarding the allotment of the money.

Generally speaking cotton should be planted between June and September, hence it was not likely that it would be necessary to advance any money before May or June. An exception might perhaps be made, as suggested by his Excellency, in connexion with clearing lands covered with scrub at Piccadilly : in that case some small advance might be made towards clearing. There must also be a minimum limit as regards the amount lent : possibly no loan would be considered on a smaller basis than 10 acres of cotton (i.e. £20).

Cotton Cultivation at Barbados.

The following observations, which appeared in the Barbados *Agricultural Reporter* of January 16, are specially useful in calling attention to the need for intelligent and careful treatment of the cotton fields at the present time. We have recently seen a fine field of cotton, ready to be picked, utterly neglected and the fibre allowed to be blown about and destroyed by wind and rain. No industry can prosper, if steady attention is not devoted to it :—

The cotton field is now in evidence everywhere, and just now it may be seen at all stages. There are young fields recently planted, very healthy and promising. There are more advanced fields just throwing out flowers and bolls —as many as eighty pods were counted on one plant at Westmoreland just lately—and again there are fields now yielding produce. Some planters have begun already to give cotton a bad name. 'The worm and the disease destroy it. It does not give the return prophesied. It costs too much to grow it and reap it. The expense of ginning and shipping it cuts too deeply into the profit.'

Worm and fungus are, no doubt, a drawback ; but it has been seen that the injury by the former is much exaggerated, and that the latter may be combated and overcome. We cannot expect a good return from cotton or anything else without careful cultivation. Some planters have not kept their cotton fields as clean as they were advised, and some have thought they could plant cotton following upon second crop canes, without much tillage or any manure and yet expect a good return. There are fields of cotton now about to be reaped that have received as careful attention and as liberal treatment as first crop canes. If the return from these fields prove unsatisfactory, then there will be reason for disappointment; but it does not look like it to-day. As to cost of picking, especially, we are informed that in America they pay 45 or 50 cents per cwt. of seed-cotton ; that the reapers pick 100 lb. a day and could pick 200 lb., if they chose ; that in Montserrat they pay one shilling per 100 lb. for picking. It is understood that it is a business that must be learned, and at first it is very tedious. It appears to us that some intelligent person should be sent in charge of the pickers on the first occasion, to illustrate to them what is required, and then the women may reasonably be expected to pick the cotton carefully at 6*d*. a day for 50 lb.

Porto Rico Cotton.

The London *Times* (Weekly Edition) of December 25, 1903, has the following note on the sale of Porto Rico cotton in England :—

Mr. A. A. Paton, Vice-chairman of the British Cotton Growing Association, states that he has sold through Messrs. F. Zerega and Co. 13 bales of Porto Rico cotton at 14½*d*. per lb., and 33 bales more are to be delivered in Liverpool this week. The first lot was sold in small parcels, so that the spinners of the country might test its rare qualities. Altogether from 1,000 to 1,200 bales are to be shipped this season, and there is confidence that the price realized by the cotton just sold will stimulate cotton cultivation throughout the West Indies. Messrs. F. Zerega and Co. presented the above Association with all the seed from the cotton, and it is to be distributed among the West Indian Islands. In the view of Mr. Paton this is the finest cotton ever imported into Liverpool, and it is noted that for the cultivation of this fibre the climate and soil of the islands are peculiarly adapted.

BOTANICAL LABORATORY AT JAMAICA.

The following letter has been received by the Imperial Commissioner of Agriculture from Dr. N. L. Britton, the Director-in-Chief of the New York Botanical Garden, dated December 26, 1903, in reference to the facilities that are being offered for research in tropical botany at Cinchona, Jamaica :—

Referring to my letter of August 14, 1903, [see *Agricultural News*, Vol. II, p. 311] I take pleasure in stating that the group of buildings of the Colonial Government of Jamaica at the Cinchona Botanical Gardens will be maintained as a Botanical Laboratory by the New York Botanical Garden, under an agreement with the Colonial Government, and with the co-operation of the Department of Public Gardens and Plantations of Jamaica; sufficient land for experimental purposes and for a nursery is included in the leasehold privileges. The buildings include a residence known as Bellevue House, three laboratories, two ranges of glass, and one or two small buildings suitable for lodgings.

Investigators are offered the following facilities :—

1. The use of tables in the laboratory buildings.

2. Lodging in Bellevue House or in one of the other buildings at Cinchona.

3. The use of land for experimental purposes.

4. Privileges to study the plantations at Cinchona and also those at Hope and Castleton Gardens.

5. Privilege to consult the botanical library of the Department of Public Gardens and Plantations at Hope Gardens, and to take books therefrom to Cinchona under such conditions as may be imposed by the Director of Public Gardens and Plantations.

6. An immense number of indigenous species is within easy reach in the primitive forests adjacent to Cinchona.

All persons who may apply for permission to study at Cinchona must submit such evidence as the Director-in-Chief of the New York Botanical Garden may require, that they are competent to pursue investigation to advantage. While in residence at Cinchona, they will be under the supervision of the Hon. William Fawcett, Director of Public Gardens and Plantations, to whose interest and advice the establishment of this American Tropical Laboratory is largely due.

A laboratory fee, payable to the New York Botanical Garden, will be required of persons granted the above privileges.

Upon approval by the Scientific Directors of the New York Botanical Garden, any other institution, society or individual may be assigned the use of a table at Cinchona by the payment of $100·00 annually, which will entitle them to nominate students desiring to avail themselves of the facilities of the laboratory for admission without the payment of fees, but not more than one person may be granted the use of any table at the same time.

The necessary expenses for a month's residence at Cinchona, including travelling expenses to and from ports on the Atlantic seaboard of the United States, are from $140·00 to $200·00; for two months' residence, $160·00 to $230·00.

BEE-KEEPING.

Bee-paralysis and Sulphur.

It is not uncommon for a bee-keeper to notice individual bees come staggering out of a hive and after a great deal of restlessness fall over on one side and eventually die. These are the symptoms of bee-paralysis. This disease has never had much attention paid to it by the bee-keeper, because it seldom causes the loss of the colony affected, but yet it is very distressing to watch a bee lose its life in this way.

In *Gleanings in Bee Culture* for December 15 last, the following reference to the successful use of sulphur as a cure for bee-paralysis is made :—

In preparing the index for 1903 I was greatly surprised to see the number of cases during the past year of the successful use of sulphur for curing bee-paralysis. These, coming from time to time, did not attract my special attention : but the fact that so many of them confirm O. O. Poppleton's observations all through, is somewhat significant. Indeed, I think we may safely conclude that the once incurable disease is now easily curable.

On reviewing the articles above indicated, it is found that a colony of bees affected with bee-paralysis is treated by simply sprinkling about a tablespoonful of finely powered sulphur over all the brood combs.

COLUMBIAN CASSAVAS IN INDIA.

The following is a letter addressed by the Inspector General of Agriculture in India to the editor of *Indian Planting and Gardening* on the subject of the cultivation of varieties of Columbian cassava obtained from Mr. Robert Thomson, of Jamaica :—

The cuttings sent by Mr. Robert Thomson to the Punjab Government either failed to germinate or the weak plants which grew from some of them subsequently died. The importation into Bombay proved to be more successful. Some of the cuttings were dead when they arrived. A proportion of the remainder germinated satisfactorily. A good many varieties are represented. Some varieties grew excellently, and all did fairly well. The tubers from a single plant weighed in some cases over 30 lb. These varieties appear to be easy to grow and are propagated from cuttings got from the main stems and maturer parts of branches. Consequently a well matured plant yields a considerable number. . . . . The cultivation will now be carried from the experimental plot to the field. Arrangements have been made to compare these imported varieties with varieties which have long been cultivated in various parts of India. The drought-resisting capacity claimed for the imported varieties will be tested; also their comparative values for the production of tapioca flour and for the production of tubers to be used as vegetables. It is possible that fully matured plants yield tubers best suited for the former purpose, whilst tubers fit for use as vegetables can be dug about six months after the sets are planted. These points have not yet been fully worked out. An inquiry into the poisonous characters of some varieties has been begun. I can promise that if the Columbian varieties are proved to be an introduction of agricultural and commercial value, every effort will be made to spread the cultivation.

RELATIONSHIP OF WOODS TO DOMESTIC WATER SUPPLIES.

The following paper, on the 'Relationship of woods to domestic water supplies', taken from the *Journal of the Board of Agriculture*, December 1903, gives useful information upon this interesting subject :—

This subject has, for more than twenty years, occupied much of the attention of Forest Experimental Stations, especially in Germany, France, Austria and Switzerland, and in view of its importance the conclusions arrived at may be usefully summarized.

It has been asserted, and theoretically the contention is doubtless correct, that masses of woodland increase the rainfall. The causes of this result are sought for in the reduction of temperature associated with forests, and in the greater absolute and relative humidity of the air in woods. But although it may be possible to obtain experimental proof by means of elaborate and long-continued observations in a region where extensive afforestation or deforestation is taking place, it may at once be said that such tree-planting, as is practically possible in Britain, can have no appreciable influence on the rainfall. Trees do, however, under certain conditions of the atmosphere, condense dew on their leaves and branches, and this effect may often be seen in the wet state of the ground underneath trees on a foggy morning when the surface elsewhere is comparatively dry.

But the case is materially different where the fate of the rain and snow that fall on a tract of woodland is considered. The foliage, branches and stems of the trees intercept much of the rain and snow, so that it never reaches the ground at all, the amount so intercepted usually ranging from 30 to 45 per cent. of the total, but much depends on the character of the rainfall and on the species of tree. In a district of heavy annual rainfall a smaller proportion of the precipitation is caught by, and evaporated from, the trees than where the rainfall is light. Similarly, in the case of heavy and long-continued rain, as contrasted with gentle showers ; in the latter case, in fact, but little of the water reaches the ground through the leafy canopy of a dense forest. Then again, much depends on the kind of tree, evergreens intercepting more water throughout a year than deciduous trees ; and a larger proportion of the rainfall is evaporated from the leaves and branches in summer than in winter.

But although less rain-water reaches the soil of a wood than finds its way to the ground in the open country, the moisture in the soil is much better conserved in the former than in the latter case. This is due partly to the exclusion of the sun's rays by the foliage, partly to the absorbent and retentive character of the decaying vegetable matter that covers the ground of a dense and well-managed wood, and partly to the air in a forest being more humid and thus better fitted to discourage evaporation. The lace work of tree roots, too, that occupy the soil of a forest, offers mechanical resistance to the rapid surface-flow and percolation of water. It is also to be noted that roots penetrate to great depths, and when they die, they leave holes through which water readily penetrates from the surface. The friable condition of the soil of a wood, too, permits ready percolation of water, whereas in the open country the denser character of the surface of the ground is less favourable to the entrance of water. The consequence is that streams in a wooded country are not so subject to rapid rises and falls, the flow being maintained more equally throughout the year.

Where water-supply for domestic or industrial purposes is concerned, the avoidance of violent freshets on the one hand, and of scanty flow on the other, is alike desirable. Not only may the water of sudden and heavy floods be lost owing to the incapacity of the reservoir to contain it, but such floods have also the disadvantage of carrying much mud and similar material in suspension, and this gradually silts up reservoirs, besides entailing increased expenditure in filtering.

It may be pointed out that the water of a reservoir surrounded by well-stocked woodland is not subjected to the same amount of violent agitation during gales as is the case where such sheltering agency is absent. The mud and silt deposited on the bottom, and especially along the margin, is, consequently, left comparatively undisturbed, with corresponding advantages in the matter of purity.

When a catchment area is covered with trees, and with the vegetable matter that accumulates on the surface of the ground, the water that reaches the soil as rain is impeded in its flow and its evaporation is hindered, so that the general effect is equivalent to an increase in the size of the reservoir. It is also important to note that snow melts more slowly underneath trees than in the open country, so that at a time of thaw the snow-water is yielded up more gradually.

Forests not only affect the degree of moisture in soil, but they also exert a considerable influence on the soil temperature. Although this influence is greatest at the surface of the ground, it is also perceptible to a depth of several feet. On the average of a large number of Continental Stations, it was found that woods of various species and ages depressed the mean annual temperature at the surface of the ground by about 2·6° F., while even at the depth of 4 feet the reduction of temperature was 2°.

This general cooling influence is due to a variety of causes. The foliage of the trees excludes the sun's rays, the decaying vegetable matter that covers the ground prevents the free exchange of air between the soil and the atmosphere, while the water in the soil absorbs much heat without its temperature being much affected.

While woods have a depressing influence on the mean annual temperature, it is found that this effect is much greater in summer than in winter. On the average of eleven German Stations, the July temperature of the surface soil in the forest was found to be 7° F. lower than that in the open field, whereas in December the former was rather warmer than the latter. Forests, therefore, tend to equalize the temperature of water collected in them, the temperature being slightly raised in winter and markedly reduced in summer. This result would appear to be of considerable practical and hygienic importance, where a supply of water for domestic purposes is concerned.

To the credit of forests is also to be placed the fact that they exercise a purifying influence both on the air and on the soil, germs of all kinds being markedly scarcer in a well-wooded district than in a similar extent of treeless country.

Felling Trees by Electricity. Successful experiments are reported from France with regard to the felling of trees by electricity. According to a recent issue of *Le Jardin*, in various forests the plan has been tried of using a platinum wire heated to a white heat by an electric current instead of a saw. By this means the tree is severed more easily and rapidly than by the older methods ; no sawdust is made, and the slight charring produced by the burning wire preserves the wood. The new principle is said to be eight times as speedy as when a saw is used. (*Gardeners' Chronicle*, January 2.)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 15 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

VOL. III. SATURDAY, JANUARY 30, 1904. No. 47.

NOTES AND COMMENTS.

Onion Seed.

With the view of securing a supply of selected onion seed for planting this year in the West Indies, it is desired that orders for such seed (specifying whether white or red onion seed is required) should be handed in to the local officers of the Department not later than Saturday, February 20 next.

In any case it is important that all orders for onion seed should reach the Imperial Commissioner of Agriculture not later than February 27. The seed so ordered would be specially selected for the Department and arrive in the West Indies about August next.

The Woods of Barbados.

At the regular monthly meeting of the Barbados Natural History Society, held at the Planters' Hall on Wednesday, January 13, an interesting and instructive paper on the 'Woods of Barbados' was read by Miss Robinson.

A description was given of the botanical characteristics and the appearances and uses of the woods of a large number of trees found in Barbados. These included the mahogany, tamarind, Barbados cedar, Barbados ebony (*Albizzia Lebbek*), lignum vitae, manchineel, logwood, fiddle wood, scarlet cordia, bay berry, bully tree, locust, fustic and others.

We notice that the white cedar or white wood (*Tecoma leucoxylon*) has apparently been omitted through inadvertence. No account of the woods of Barbados would be complete without a reference to this useful timber tree.

Fruiting of the Traveller's Tree.

Mention was made in the *Agricultural News*, Vol. II, p. 412, of the fruiting of the Traveller's Tree (*Ravenala madagascariensis*) in Borneo, and it was suggested that instances of the fruiting of this tree in the West Indies might be recorded. We published on p. 12 of the present volume a note as to observations made in St. Vincent by Mr. J. B. Dopwell, Foreman of the Botanic Station. Mr. J. H. Hart, Superintendent of the Royal Botanic Gardens at Trinidad, has also communicated interesting information relating to this matter.

As far as Mr. Hart is aware, the tree has never fruited in the Botanic Gardens at Trinidad, but several plants raised in the Gardens have flowered in different positions as follows:—

(1) In a villa garden in St. Anne's Road, Port-of-Spain, in 1895; (2) several at St. Madeline Usine, in 1897; (3) now in flower at All Saints' Rectory, Port-of-Spain.

Barbados Central Cotton Factory.

The Central Cotton Factory at Barbados was re-opened by his Excellency Sir Frederic Hodgson, K.C.M.G., on Monday, January 25. The factory is now provided with six gins, a baling press and everything necessary for dealing with the present crop.

The Chairman of the Cotton Committee (his Honour F. J. Clarke) presided, and after mentioning that the factory, opened by Lady Morris on July 31 last, had been greatly extended and improved, invited his Excellency to re-open the factory for the season 1904.

His Excellency briefly reviewed the steps that had led to the erection of the factory and mentioned that the thanks of the planters were due to the Cotton Committee, the Imperial Commissioner of Agriculture and Mr. J. R. Bovell for the efforts they had put forth in endeavouring to establish this new industry. He also alluded to the considerable assistance afforded by the British Cotton Growing Association and the grants voted by the Barbados Legislature. He wished the industry every success and declared the factory open.

Sir Daniel Morris in thanking his Excellency for re-opening the factory stated that the factory had cost £903, of which the Government of Barbados had contributed £640 and the British Cotton Growing Association £263. He emphasized the need for the planters to thoroughly clean and assort their cotton before sending it to the factory. He regretted to state that reports had reached him that in some parts of the island the cotton cultivation was not being looked after so closely as was desirable. He urged that the planters who had received seed, free of cost, were in duty bound to cultivate and care their cotton until it was gathered, even if it had to be done at a loss. In experiments of this sort as much was to be learnt from failure as from success. He was confident that when the planters realized the situation, they would do all in their power to assist in establishing a successful cotton industry in Barbados.

Care of Farm Implements.

The care of implements is a matter to which far too little attention is usually paid by agriculturists. It is especially necessary in tropical countries that tools and implements should not be neglected. We would suggest that efforts be made to instil this into the minds of the young: lessons might well be devoted to this matter in the elementary schools. Moreover, it should be a *sine qua non* of the receipt of a grant for agricultural teaching that proper provision is made for the tools to be used by the scholars.

The *Agricultural World* of January 2 draws attention to the necessity of keeping machines and tools under cover when not in use, in order to avoid injury by weathering. The importance of a coat of paint as a protection to woodwork is generally well recognized, but the paint is seldom used.

Another point is the damage that is done to the wearing parts of machines and implements through neglect to use oil and grease. Again, nuts and screws are allowed to rust through want of oil, with the result that the threads become worn out and the nuts and screws cannot be removed without injury.

Careful attention to such points as these will cause farm implements to last much longer and, further, to give much greater satisfaction while in use.

Cotton at St. Vincent.

A short note appeared in the *Agricultural News* (Vol. II, p. 408) on the state of the cotton experiment plots at St. Vincent. A further report, dealing with the plots in Bequia, has recently been received from Mr. Osment, the Agricultural Instructor.

The plot at Union consists of 5 acres—$2\frac{1}{2}$ in Upland and $2\frac{1}{2}$ in Sea Island. The condition of both plots was good and the plants were bearing well. The average number of ripe and unripe pods on the Upland cotton was twenty-five; on the Sea Island, thirty-five. About 800 lb. of seed-cotton had been picked from the Upland plot. Only a small quantity of the Sea Island cotton had been picked.

At St. Hillary the plot required weeding, but the cotton plants appeared to be healthy. The same acreage had been planted as at Union. Over 400 lb. of Upland cotton had been picked and the plants still had a fair number of ripe and unripe pods on them. The picking of the Sea Island cotton was still in progress, about 50 lb. having been already picked.

On both plots the Sea Island plants had been blown over to some extent by the strong winds: the Upland variety has not suffered much, apparently being able to withstand the wind better.

The Agricultural Instructor also reports on a number of cotton plots, other than Departmental, in the district. The plots, though small, appeared to be well looked after, and the plants were bearing well. Mr. Osment remarks: 'The planting of cotton experiment plots by the Imperial Department of Agriculture at Bequia has given the people an opportunity of seeing the proper way cotton should be planted and the necessity for planting the best varieties'.

Relationship of Woods to Water Supplies.

We reproduce on page 39 of this issue a summary of the conclusions arrived at by the Forest Experiment Stations in Europe in connexion with investigations as to the 'Relationship of woods to domestic water supplies.'

It is not considered probable that the rainfall can be appreciably increased by such tree-planting as is possible in Britain, but it is pointed out that the great advantage of woods lies in their conserving soil moisture and consequently increasing the amount of available water. Not only is the soil protected by the foliage from the hot rays of the sun, but it is also rendered much more retentive and absorbent by the decaying leaves that have dropped from the trees. Moreover, the soil being in a more porous and friable condition, the rain-water finds a more easy entrance than it would in the open country. All this has an appreciable influence upon the flow of streams that have their sources in a well-wooded district.

Forests also have a cooling influence on the soil, which is due chiefly to the exclusion of the sun's rays. Since, however, this depressing influence is much greater in summer than in winter, the effect of forests is to equalize the temperature of water collected in them, and this, it is pointed out, may be of considerable importance from a hygienic point of view.

Agricultural Improvements in the Leeward Islands.

In the Leeward Islands *Blue Book* for 1902-3, the following review is given of the recent improvements in Agriculture in the colony :—

Owing to the critical condition of the sugar industry no substantial improvements in machinery have been made.

Increased attention is being given to the cultivation of new varieties of sugar-cane, which have now largely replaced the Bourbon variety throughout the sugar districts of the colony. The investigations in connexion with varieties of sugar-cane and the manurial requirements of this crop have been continued by the Imperial Department of Agriculture, the expenses being defrayed from Imperial grants. The results of these investigations are followed with considerable interest by those engaged in the sugar industry.

A small, but substantial, onion industry has been established in Antigua, and a useful effort has been made in the same direction in Montserrat.

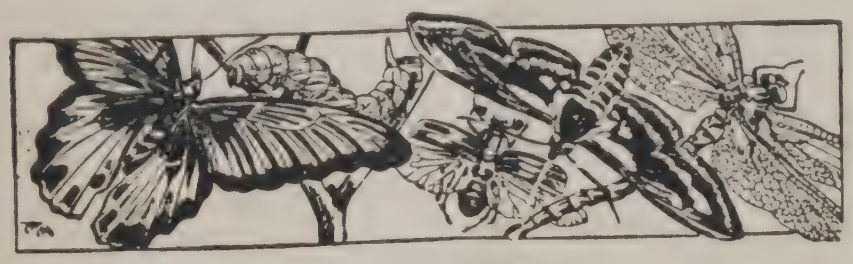
Owing to the low price of sugar, more attention has been given to the cultivation of corn (maize).

Cotton has been planted on a considerable scale in St. Kitt's and Montserrat, and on a small scale in Antigua. This industry promises to be of very great importance to the Leeward Islands.

In Dominica the activity in increasing the cultivation of limes and cacao has been well maintained, new plantations have been opened and old ones extended.

In Montserrat considerable progress has been made in the way of restoring cultivation of lime trees and food supplies after the diastrous hurricane of August 7, 1899.

In the Virgin Islands efforts are being directed towards the establishment of such industries as cotton growing, limes and pine-apple planting, etc., for which purposes the climate and soil are well adapted.



INSECT NOTES.

The Botanic Stations at Dominica and St. Lucia.

Mr. H. A. Ballou, B.Sc., the Entomologist on the staff of the Imperial Department of Agriculture, recently spent a short time in Dominica and St. Lucia while *en route* for and returning from Montserrat, and has presented to the Imperial Commissioner of Agriculture a report on his visit to the Botanic Stations in those islands, of which the following is a brief summary :—

DOMINICA.

The plants at the Botanic Station were found to be in good condition as far as insect pests were concerned. Overgrown and useless nursery stock was torn out and burned, and the remaining nursery stock was quite free from scale insects ; while in the Gardens and plots only a few common scales were seen and these were not doing appreciable damage.

Limes in the island have greatly improved during the wet season, the purple scale (*Mytilaspis citricola*) having almost entirely disappeared from some estates.

The Bath estate in its present condition shows what may be done by persistent spraying. Kerosene emulsion as a spray has been largely replaced by rosin wash (see Pamphlet No. 5, p. 12). The rosin wash has been found much cheaper, quite as efficient and much less likely to injure the leaves. Kerosene emulsion is frequently improperly prepared and in consequence sometimes burns the foliage and young twigs. This does not happen with the rosin mixtures.

Lefroy's mixture (crude Barbados oil and whale oil soap) is being tried on a small scale, and if it seems to give good results, will be tried on a larger scale in comparison with the rosin wash. This is very cheap when made in large quantities, and so far as tried has given good results. An account of this insecticide, with directions for mixing, is given in the *West Indian Bulletin* (Vol. III, p. 319).

A fumigating chamber is being built at the Station, and very soon Dominica will be in a position to fumigate all imported plants and cuttings and thus do much to prevent the introduction of new pests.

ST. LUCIA.

This report mentions that no new insect pests were noticed and very little damage was being done by the well-known forms, though a few of them were found in small numbers.

The Station has a good equipment of spraying apparatus and insecticides, and considerable attention is paid to spraying, with very good results.

Mention is also made of the occurrence of the mite of the cotton, *Eriophyes* (Phytoptus) *gossypii*, on a few cotton plants growing in the Gardens. Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, remembers seeing this disease of cotton for many years and believes it to be generally distributed over the island, but states that hitherto it has done but little damage.

Insect Pests of Rubber Trees.

Writing in the *Agricultural Bulletin of the Straits Settlements* for October last, Mr. H. N. Ridley, M.A., F.L.S., Director of the Botanic Gardens at Singapore, describes a longicorn beetle which has been observed attacking a young *Castilloa* tree in that colony. Mr. Ridley mentions that this beetle appears to be *Epepseotes luscus*, of wide distribution in the Eastern Archipelago. The perfect insect is described as being $\frac{3}{4}$ inch in length and $\frac{1}{4}$ inch across the back. The elytra (or wing covers) are brown, mottled with yellow, with a round, black, velvety spot on each shoulder.

At Anandale estate, Grenada, West Indies, a longicorn beetle has also been noticed by the Hon. W. H. Lascelles to attack young *Castilloa* trees. A female specimen of the Grenada insect was forwarded to the Head Office at Barbados for examination and was recognized by Mr. Maxwell-Lefroy, then Entomologist of the Department, as *Taeniotes scalaris*, a species which is known to attack bread-fruit and wild rubber (*Ficus* sp.) trees in these islands. The West Indian beetle is about the same size as its Eastern relative, but differs from it in appearance, being on the upper side of a dark-brown or almost black colour. The elytra are marked, throughout the entire length of their inner margins, with a narrow, yellow stripe and have also on each wing cover two or three small scattered spots of the same colour. Both species tunnel through the bark and have been found in the central pith of the tree.

In the treatment of *Epepseotes luscus*, Mr. Ridley recommends passing a wire down the hole made by the beetle grub and applying Jeye's fluid. Mr. Maxwell-Lefroy also recommends probing the holes with a hooked wire and suggests the application of a mixture of carbolic acid and soap. He also advises setting trap logs of wild rubber (*Ficus* sp.) among the *Castilloa* trees and hand-catching the beetles in the early morning.

The above is interesting as illustrative of the similarity of the attacks made by insects of this family on *Castilloa* rubber trees in both Eastern and Western quarters of the globe.

Cotton Leaf-Blister Mite.

Mr. A. J. Jordan, Agricultural Instructor at Montserrat, has recently concluded a series of experiments with several insecticides for the control of the cotton leaf-blister mite so common in that island.

Several of the well-known contact poisons were used as sprays and a dry mixture of lime and sulphur was dusted on to the plants. All the plants were badly affected by the disease and no difference was to be seen in their condition ; but at the conclusion of the experiment, those plants treated with lime and sulphur were in a much healthier state than the others.

The plants were cut and weighed, and the results carefully tabulated. The plot on which they grew was not treated except by the application of lime and sulphur. Young plants are coming up and, although those removed were badly infested, apparently the seedlings are comparatively free from the disease.

While this experiment is not conclusive, it indicates that lime and sulphur will probably furnish a means of control for this very serious pest. Similar experiments were started in Montserrat early in September last (see *Agricultural News*, Vol. II, p. 309), but owing to unfavourable weather conditions they were discontinued before any results had been reached.

THE BOTANIC STATION AT ST. VINCENT.

We take the following extracts from an account of the Botanic Station at St. Vincent by the Foreman, Mr. J. B. Dopwell:—

In one of the rich, well-sheltered valleys of St. Vincent, at an elevation of 203 feet above the sea-level, and about ½ mile north of Kingstown, will be found the Botanic Station. Here was formerly situated the old garden said to have been the first institution of its kind in the West Indies. The following historical extract is taken from the Rev. Lansdown Guilding's account of the Botanic Gardens, St. Vincent, (1765-1825):—

This garden seems to owe its origin to certain advertisements in the *Transactions of the Society of Arts* for 1762 and the four following years, offering rewards to any one who should cultivate a spot in the West Indies in which plants, useful in medicine and profitable as articles of commerce, might be propagated, and where nurseries of the valuable productions of Asia and other distant parts might be formed for the benefit of His Majesty's colonies.

General Melville, who was then Chief Governor of the Windward Islands, with a laudable and patriotic zeal resolved to commence the task, and in 1765 gave and cleared at his own expense 20 acres of land in the most favourable situation he could find. . . . . .

So great was the interest taken in this garden, which promised to be a source of much profit to the colonies and of commerce to the mother country, that His Majesty was pleased in 1790 to send a ship to the South Seas to procure for it the bread-fruit (*Artocarpus incisa*) and every other valuable tree that could be obtained. The lamentable termination of this first voyage is known to every one. Not discouraged by the fate of the first, the King determined to fit out a second ship of discovery, and shortly afterwards Captain Bligh set sail in the 'Providence'. . . In December 1792, Captain Bligh touched at St. Helena on his return, and in January 1793, attended by Captain Portlock of the 'Assistant' brig, landed the best portion of his valuable cargo, about 530 plants, on the shores of St. Vincent. . . . . .

The extent of the garden, which is of irregular figure, does not exceed 39½ acres. In May 1823, most of the valuable plants at the St. Vincent Botanic Station were removed to the Trinidad Gardens, after which time some of the best trees were either stolen or disappeared through neglect, as no responsible person except a labouring man was placed in charge of the grounds.

After many years of neglect and decline, the Botanic Station was re-established in May 1890 owing to the efforts of Sir Walter Hely-Hutchinson, G.C.M.G., then Governor and Commander-in-chief of the Windward Islands, now Governor of Cape Colony. At this time Mr. Henry Powell, who has recently left St. Vincent to take up an appointment at Mombassa, East Africa, assumed the duties of the curatorship. Then there were merely a few plants dotted here and there, notably cinnamon, clove, nutmegs and bread-fruit, and though some of these have been destroyed by hurricanes, others are well preserved.

Entering the Station by the southern entrance, one comes to the circular drive. At the base of the central avenue, just above the circular drive, stand two fine specimens of the toddy palm (*Caryota urens*). At this point three walks meet, viz., the central avenue, the lovers' walk and the walk leading to the western entrance. These walks meet again at the rose garden and are again continued up to the nurseries and on to Government House.

The ground between the central avenue and the walk on the left is chiefly under nutmeg cultivation. On the other side are planted various rubber plants, coffee and timber trees. Along both sides of the central avenue are planted *Caryota* palms at intervals of about 60 feet, with a variety of other palms between. Then comes a plantation of grafted mangos. This order of planting continues for about 120 yards and then terminates in a rose garden.

About 30 yards from the rose garden is the Curator's office, to the east of which lies the nursery where plants are propagated for distribution to planters.

THE MANUFACTURE OF PERFUMES.

The following account of the manufacture of perfumes and flower essences in Grasse is taken from the *Journal of the Society of Arts* of November 20, 1903:—

The city of Grasse, the most important industrial place of the Riviera, is widely known on account of its perfume manufacture. At present thirty-five establishments making essences of flowers are in operation there. The average consumption of roses for that purpose is about 2,650,000 lb., and that of orange flowers about 660,000 lb. per annum. The annual sale of these essences amounts to about £200,000. Vallauris has nine such factories. The most important product of this industry is oil of neroli, made from the flowers of the bitter orange. A kilogramme (2·2 lb.) of this oil is worth £12. From the peel of the bitter orange, oil of orange is made. The peel of the sweet orange is seldom used for making oil. The manufacture of essence of roses is also very extensive. The so-called oil of roses is manufactured from *Andropogon Schoenanthus*. The flowers of the large-flowered jasmine yield the oil of jasmine. One acre planted with jasmine is said to yield a yearly product worth £250, but requires a good deal of work. A pound of essence of violets is worth from 9*s*. to 10*s*. Oil of geranium is produced from the flowers of *Pelargonium capitatum*. The flowers of the tuberose, of the jonquil, and of a species of narcissus are manufactured into essences; also the leaves of the citronella plant, the root of the *Iris florentina* (violet root), the patchouli flowers, sandalwood, etc. Fortunately for many places in the Riviera, the consumption of these essences has not decreased in late years.

DEPARTMENT NEWS.

The Fish-curing Factory, which is being established at Barbados under the auspices of the Imperial Department of Agriculture, was opened on Saturday, January 23, for inspection by a number of leading merchants and others. The visitors were received by Sir Daniel Morris, who addressed a few remarks giving an account of the successive steps which had led to the establishment of the factory. A considerable quantity of cured fish had already been successfully exported to British Guiana and Trinidad, and forty barrels of flying-fish, albacore, dolphin and sprats either pickled, salted or dried, were now available for disposal at reasonable prices. He mentioned that Barbados imported every year salted and pickled fish to the value of £47,000, and ventured to think that a portion of this sum, at any rate, might be saved, and the island greatly benefited.

GLEANINGS.

A ton of selected Sea Island cotton seed has been ordered through the Imperial Department of Agriculture for use in Jamaica during the next planting season.

Among the exports from British Guiana for the period January 1, 1904 to January 12, 1904, are mentioned 502½ tons of molascuit.

An old time distich, reminiscent of the period when Barbados largely produced cotton, still survives amongst the peasantry :—

'I live in the thickets : I live very well,
Upon guinea corn, coco and cotton to sell.'

The *Board of Trade Journal* referring to the exports of Grenada, says : 'Cotton and cotton seed are at present exclusively the product of Carriacou, the principal dependency of Grenada. In 1902, the actual export was 2,212 cwt. of raw cotton, and 4,536 cwt. of cotton seed, valued at £4,069.'

At a meeting of the Managing Committee of the St. Lucia Agricultural Society on December 30, Sir Daniel Morris promised, if the necessary arrangements could be carried out, to attend a Conference of landowners and planters at Castries on Tuesday, February 23, to discuss the prospects of the cotton industry.

Mr. A. H. Clark, a graduate of Harvard University, is on a visit to the Lesser Antilles for the purpose of making collections of fossils and mammals. Mr. Clark is specially interested in bird life and he has already made investigations likely to be of value from the scientific as well as the agricultural point of view.

The *Journal of the New York Botanical Garden* for November 1903 contains an interesting report by Professor F. E. Lloyd on a 'Botanical expedition to the island of Dominica, British West Indies.' Professor Lloyd acknowledges his indebtedness for valuable suggestions and assistance received from Mr. J. Jones, the Curator of the Botanic Station, and states that 'Roseau can boast of a very delightful and useful Botanic Station.'

The *Annual Report of the Smithsonian Institute* for 1902, which has just been issued, contains two articles on the volcanic eruptions in St. Vincent and Martinique. One of these is the preliminary report of Drs. Tempest Anderson and J. S. Flett, reprinted from the *Proceedings of the Royal Society*, while the second is by J. C. Russell, of the United States National Geographical Society Expedition to the West Indies. At the conclusion of the latter paper, there is printed a useful bibliography of magazine articles, reports, etc., concerning these eruptions.

A Prize List of the Demerara County Show 1904, to be held at Eve Leary Barracks on February 26 next, has been forwarded to this Office through the courtesy of Mr. T. S. Hargreaves, the Secretary of the Show Committee. We notice that an extra prize is offered by his Excellency the Governor for 50 lb. of beef corned in the colony, and also one, offered by Mrs. Macquarrie, for the best conditioned, groomed and harnessed donkey.

We learn from the Jamaica *Daily Telegraph* of January 12 that there is every possibility of an industry in cassava starch being worked up in that colony. A factory has been erected and the proprietor (Mr. J. W. Middleton) is about to make a trial shipment of 1 ton to England. A sample of starch from this factory was recently pronounced by Mr. Cousins to be 'free from acid and all impurities'.

The cultivation of bees is rapidly becoming a national industry in America. It is estimated that 300,000 people are more or less interested and engaged in bee culture. Thirty years ago the output of honey was estimated at 15,000,000 lb. ; its value last year is estimated by the Government at £4,000,000. As is so often the case with American industries, a pleasing feature of bee-keeping is the large number of small farmers who follow it. (*Indian Planting and Gardening*, November 28, 1903.)

Another very wise precaution to prevent cocoa-nut palms being up-rooted by wind is to plant the seed-nuts at the bottom of holes, 3 feet deep. The holes so dug are not filled up by hand, seeing that the light sandy soil fills up the hole in course of time. The roots of palms planted in this manner are naturally deeper and better covered than are those of trees grown from seeds embedded in the usual manner, immediately below the surface. (The *Colonial Report on the Cocos-Keeling Islands* for 1903.)

Mr. William M. Smith, Acting Agricultural Instructor at Grenada, writes : 'The planters here complain of the great increase of the "Brown Rot" fungus during the past year. They have lost sight of the fact that, although the burying and burning of the pod shells in the field is expensive, the saving of the cacao trees from the disease more than compensates for the expense incurred in this way.'

A circular (No. 52) recently issued by the Office of Experiment Stations of the United States Department of Agriculture gives a list of 'A few good books and bulletins on nature study, school gardening and elementary agriculture for common schools.' The aim of the circular is to recommend a few books that are likely to be useful to teachers and pupils. It is also suggested that the books mentioned might serve as a nucleus for a public school agricultural library.

Potatos meant to be used for planting require vastly more careful treatment than potatos meant only to be eaten. Sometimes potatos are raised from the beginning, in a special field with special treatment of the soil, special cultivation, and altogether special attention, to be sold for seed purposes; but mostly such high cultivation is given nowadays to all farm crops, that an ordinary field is gone through, and the finest and healthiest-appearing plants are chosen, and those that yield prolifically of good sized potatos, not necessarily the largest, but the best merchantable yield, are taken, and the soundest potatos chosen from these as 'seed.' (*Journal of the Jamaica Agricultural Society*, December 1903.)

EDUCATIONAL.

Agricultural Teaching in Jamaica.

At a meeting of the Board of Agriculture of Jamaica held on November 10 last, on the invitation of the Chairman (the Hon. Sydney Olivier, C.M.G.,), Sir Daniel Morris, K.C.M.G., spoke in reference to teaching elementary science and agriculture in the primary schools in the colony. He suggested that greater importance should be given to these subjects in the Code by allotting to them the same number of marks on inspection as is given for other primary subjects. He stated that in Trinidad and elsewhere in the West Indies there were already numerous school gardens established, and that, probably, the reason for the small number in Jamaica was that the regulations were too severe, i.e., that the ground must be at least $\frac{1}{4}$ acre in extent and that it must be fenced and tools provided beforehand. He also suggested that at all Agricultural Shows held in the island there should be a special section for school children, where they might exhibit plants grown by themselves in pots. The question of inspection was then discussed, and it appeared to the Board that if the number of the Agricultural Instructors were increased, say by four, the Education Department might invite their assistance to supervise and assist the working of school gardens and to report on them for the Department. The Board after discussion of Sir Daniel Morris' criticism recorded its opinion that the progress made in the development of agricultural elementary education during the five years, to which attention had been directed to it, was not so satisfactory as could be desired. It was resolved to recommend to the Governor that the Superintending Inspector of Schools should be placed on the Board of Agriculture in order to afford him an opportunity of keeping in closer touch with agricultural development in the colony. (*Bulletin of the Department of Agriculture, Jamaica*, December 1903.)

Lectures to Teachers in Jamaica.

We learn from Jamaica papers that the annual course of lectures to elementary school teachers commenced on Monday, January 4, and was to continue till Friday, January 29. The general programme of the course, which is similar to those of former years, except that it has been arranged for a portion of the practical instruction to be given at the Mico Training College, where the teachers are being lodged, is given as follows in the Jamaica *Times* of January 2:—

7—9.30 a.m. Practical Work and Demonstrations at the Mico, Tuesdays, Thursdays and Saturdays; at Hope Gardens on Mondays, Wednesdays and Fridays.

11.30—2.30 Agricultural Science Course by Mr. Teversham.

Afternoon, three each week, Tuesdays, Thursdays and Fridays. Addresses on special subjects at the Mico, commencing at 4.30 p.m., open to the public.

Evening, Messrs. Peet and Skyers hold classes in Manual Work by the Code.

AGRICULTURAL SHOWS.

Barbados Local Exhibition.

As stated in our last issue, the fourth Local Agricultural Exhibition and Show of Stock for Peasant Proprietors was held under the auspices of the Imperial Department of Agriculture at Lower Estate, St. Michael, on Tuesday, January 12.

The show was in every sense a success, the fine weather which prevailed throughout the day permitting a large attendance. The number of entries was not as large as at previous shows, but there was an undoubted improvement in the quality of the exhibits. There were distinct signs of greater care being bestowed upon the growth and preparation of the products, and the one hundred exhibits sent in by pupils from the Primary Schools were of distinct merit.

The vegetables shown in Class II were particularly numerous and of fine quality. The starches, meals and other prepared products in Class IV, though not as numerous as hitherto, were of a high order and formed one of the most encouraging signs of the improvement that is being steadily brought about by these shows.

The exhibition was visited by his Excellency the Governor who made a careful inspection of all the exhibits. After distributing the prizes, Sir Frederic Hodgson briefly addressed the gathering. He had been struck with the unmistakable advance on previous years, and thought they had learnt the lesson that an expenditure of time, labour and skill resulted in products of great value and more easily marketable. He advised the cultivation of vegetables, the rearing of poultry and production of eggs, by means of which they might materially increase their earnings. In conclusion he congratulated the Imperial Commissioner and Mr. Bovell on the success of the exhibition.

Sir Daniel Morris thanked his Excellency for his presence and for distributing the prizes, which, he remarked, showed the deep concern taken by him in everything connected with the interests of the people of Barbados. The better quality of the exhibits and the better style in which they were presented showed that they were advancing step by step in improving the treatment of the soil and in deriving greater profit from their labours. Their thanks were due to Mr. G. L. Pile, M.C.P., for kindly permitting the use of the buildings in which to hold the exhibition; to Mr. Bayne, the manager; to Mr. Bovell and to the judges and other gentlemen who had so largely contributed to the success of the show.

In reference to this exhibition, the Barbados *Agricultural Reporter* of January 16, has the following:—

> On visiting this exhibition, we were again reminded of the value of the Imperial Department of Agriculture to this island, not only in the efforts it has put forth to assist our principal industries, but in the development of the energies of our industrious peasantry on their small holdings, and in giving assistance to the practical education of the children in our elementary schools.

ANALYSIS OF GRENADA CACAO SOIL.

The following is a report by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., on two samples of soil from Belle Vue estate, Grenada, forwarded by the Commissioner of Agriculture for A. Wellesley Lewis, Esq :—

The samples of soil were mixed and an average sample analysed : a similar course was pursued with the samples of subsoil.

The analyses indicate a clayey soil, deficient in phosphoric acid. The total percentage of potash is rather low, but of this a fair proportion is immediately available. The amount of carbonate of lime though not great is probably sufficient for the needs of the trees. The percentage of nitrogen is rather high.

I recommend an application of 4 cwt. of basic slag and ½ cwt. of sulphate of potash per acre either dug in the holes before the cacao is planted or lightly forked in between the trees. When the trees show signs of flagging growth, apply 1 cwt. per acre of nitrate of soda as a top dressing near the trees and soon after the cacao crop has been reaped.

MECHANICAL ANALYSIS (RESULTS CALCULATED TO SOIL DRIED AT 100° C.).

	Soil.		Subsoil.	
Diameter of Particulars.	Per cent.	Pounds per Acre.	Per cent.	Pounds per Acre.
Gravel 3 millimetres to 1 mm.	2·7		4·1	
Coarse sand 1 ,, ,, 0·5 ,, ...	·7		3·0	
Medium sand 0·5 ,, ,, 0·25 ,, ...	·9		5·6	
Find sand 0·25 ,, ,, 0·05 ,, ...	22·1		21·6	
* Silt 0·05 ,, ,, 0·01 ,, ...	21·3		24·3	
Fine silt 0·01 ,, ,, 0·002 ,, ...	28·6		29·2	
Clay 0·002 ,, ,, ——	23·7		12·2	
Fine clay* 0·5 ,, ,, ——	100·0		100·0	
	96·6		92·9	

CHEMICAL ANALYSIS OF FINE SOIL (RESULTS CALCULATED TO SOIL DRIED AT 100° C.).

	Soil.		Subsoil.	
	Per cent.	Pounds per Acre.	Per cent.	Pounds per Acre.
Insoluble siliceous matter	34·967	1,049,010	33·887	1,016,610
Soluble silica	·066	1,980	·090	2,700
Potassium oxide†	·126	3,780	·126	3,780
Sodium oxide	·118	3,540	·114	3,420
Calcium oxide	·620	18,600	·640	19,200
Magnesia	·662	19,860	·756	22,680
Manganese oxide	·160	4,800	·180	5 400
Iron oxide and alumina	46·139	1,384,170	47·208	1,416,240
Phosphoric anhydride ‡	·141	4,230	·112	3,360
Sulphuric anhydride	·096	2,880	·142	4,260
Carbonic anhydride ††	·175	5,250	·205	6,150
Combined water and organic matter *	16·730	501,900	16·540	496,200
	100·000	3,000,000	100·000	3,000,000
* Containing Nitrogen	·294	8,820	·231	6,930
† Containing Potassium oxide soluble in 1 per cent. citric acid ...	·020	600	·021	630
‡ Containing Phosphoric anhydride soluble in 1 per cent. citric acid	trace	——	trace	——
†† Equal to Carbonate of Lime	·398	11,940	·466	13,980

MARKET REPORTS.

London,—January 5, 1904. Messrs. Kearton, Piper & Co., Messrs. E. A. De Pass & Co. and Messrs. J. Hales Caird & Co., 'The Liverpool Cotton Association Weekly Circular', December 23, 1903; and 'The Public Ledger,' January 2, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/6 to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/3 to 1/8 per lb.
Balata—1/9 to 2/3 per lb.
Bees'-wax—£7 2*s.* 6*d.* to £7 7*s.* 6*d.* per cwt.
Cacao—Trinidad, 64/- to 72/- per cwt.; Grenada, 53/- to 62/- per cwt.; Dominica, St. Lucia and Jamaica, 50/- to 54/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/2 per lb.
Coffee—Jamaica, ordinary, 35/- to 55/- per cwt.
Copra—Trinidad, £15 10*s.* to £15 12*s.* 6*d.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/2 to 1/3 per lb.
Divi Divi—No quotations.
Fruit—
Bananas—Canary Islands, 8/- to 11/- per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 10/- per case.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 36/- to 55/- per cwt.
Honey—Jamaica, 19/- to 28/6 per cwt.
Isinglass—West Indian lump, 2/3 to 2/11; Cake, 1/3 to 1/7 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 10*d.* to 1*s.* 2*d.* per gallon; Concentrated, £13 to £13 10*s.* per cask of 108 gallons.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/10 to 2/7 per lb.
Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.
Nutmegs—69's to 60's, 1/9 to 2/4; 90's to 80's, 1/2 to 1/6 per lb.
Pimento—3¾*d.* to 4*d.* per lb.
Rum—Demerara, 9*d.* to 10*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—No quotations.
Sugar—Crystallized, 15/- to 16/9 per cwt.; Muscovado, 11/- to 14/6; Molasses Sugar, 11/9 to 16/3.
Sulphate of Ammonia—£12 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

Halifax, N.S.,—December 29, 1903.—'Maritime Merchant.'

Bananas—$2·25 to $2·50 per bunch.
Oranges—Jamaica, $5·00 to $5·50 per barrel.
Pine-apples—$3·50 for case of 24.

New York,—January 8, 1904.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12c. to 12¼c.; Caracas, 13¾c. to 14½c.; Jamaica, 10½c. to 12½c.; Grenada, 12½c. to 13c.; Trinidad, 13½c. to 14½c. per lb.
Cocoa-nuts—Trinidads, $17·00 to $19·00; Jamaicas, $21·00 to $23·00 per M., selected.
Coffee—Jamaica, fair to good ordinary, 8c. to 8¼c. per lb.; Manchester grades, 10c. to 12c. per lb.
Ginger—Jamaica, 7¼c. to 8¼c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Grape Fruit—$5·00 to $7·00 per barrel.
Oranges—$3·75 to $4·00 per barrel.
Pimento—7½c. to 7¾c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3c.; Molasses, 89°, 2¾c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 16, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$13·00 per 100 lb.
Cocoa-nuts—$9·37 per M. for unhusked nuts.
Coffee—Jamaica and ordinary Rio, $9·00 to $9·50 per 100 lb. respectively.
Hay—$1·25 per 100 lb.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00; Sheep Manure, $6·25 per ton (ex ship).
Molasses—No quotations.
Onions—$3·50 per 100 lb.
Potatos, English—$2·75 per 100 lb.
Rice—Ballam, $5·00 per bag (190 lb.); Patna $3·60 per 100 lb.
Sugar—No quotations.

British Guiana,—January 14, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·50 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$5·50 per barrel.
Cocoa-nuts—$11·00 to $12·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 11c. to 12c. per lb.
Dhal—$3·50 to $3·60 per bag of 168 lb.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.
Onions—2½c. to 3c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
Plantains—20c. to 60c. per bunch.
Potatos, English—$2·50 to $2·80 per barrel.
Rice—Ballam, $4·60 to $4·65 per 177 lb., ex store; Creole, 18c. to 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·44 per barrel.
Tannias—$2·64 per bag.
Yams—White, $1·68 per bag.
Sugar—Dark Crystals, $1·85; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—January 14, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—34c. to 36c.
Cacao—Ordinary, $13·25 to $13·75; Estates, $14·00 to $14·75 per fanega.
Cocoa-nuts—$16·00 per M. f.o.b., selected in bags of 100, (husked).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—55c. per Imperial Gallon (casks included).
Coffee—Venezuelan, 7⅞c. per lb.
Copra—$2·50 to $2·60 per 100 lb.
Onions—$3·25 to $3·50 per 100 lb.
Potatos, English—$1·10 to $1·25 per 100 lb.
Rice—Yellow, $4·25 to $4·50; White Table, $5·25 to $5·75 per bag.
Sugar—No quotations.

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[72.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 48. BARBADOS, FEBRUARY 13, 1904. PRICE 1*d.*

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Fish-curing Industry at Barbados.

WE published in the *Agricultural News* (Vol. II, p. 217) an extract relating to experiments that were being tried in curing flying fish, in which it was mentioned that Mr. G. W. Hunt had obtained, through the Imperial Department of Agriculture, the use of buildings on the Reef Recreation Ground for carrying on a fish-curing business. These buildings had originally been purchased from the military authorities by the General Board of Health for quarantine purposes.

With the object of making better known the efforts that had been made during the last twelve months to establish a fish-curing industry in the island, and with the view of obtaining the assistance of merchants and others in disposing of the fish on a commercial scale, a number of gentlemen interested in the undertaking were invited to inspect the buildings on January 23, and to see something of the results of Mr. Hunt's efforts. Sir Daniel Morris explained that the experiment had now arrived at a stage when it must either come to an end, or embark upon a career of comparative prosperity. It was his hope that fish-curing would make such progress in Barbados as to become one of the established industries of the island. What he wished to point out was that, when an industry of this kind had been shown to be a practicable one, it was necessary, in order to carry it on on commercial lines, for it to receive general support from the mercantile community. He therefore appealed to those present to do what they could to remove any prejudice that may happen to exist as to a new food of this kind. That the fish was perfectly wholesome, the letters that had been received from Trinidad and British Guiana, to which colonies several successful shipments had already been made, amply testified.

He would like to add that, while they were endeavouring to build up an export trade in salted and pickled fish, they were particularly anxious that the fish should, as far as possible, be utilized locally by the people and in the public institutions of the colony. In this way the importations of salted and pickled fish from the United States and Canada might be reduced. Barbados imported every year salted and pickled fish to the value of about £47,000, and while it could not be hoped to save the whole of this large sum, it might be possible, if the industry were placed on a permanent footing, that at least a portion of it, say one-third, might be saved with considerable advantage to the island.

Sir Daniel stated that the subject of organizing the West Indian fisheries and rendering them more generally profitable had been engaging the attention of the Imperial Department of Agriculture for some time. He had, at one time, hoped it would be possible to establish a fishery branch of the Department as was the case with the Agricultural Departments of England, of Ireland, and of the Cape of Good Hope. The only difficulty was in regard to funds. The Secretary of State for the Colonies had approved of the proposal provided the various West Indian Colonies would contribute a share towards the cost of its maintenance. He had communicated with the different governments, but owing to the prevailing depression in the sugar industry and other circumstances, they were unable to afford material help. This was the case especially with Barbados. The reply he received in the case of this colony was that the Governor-in-Executive Committee regretted that owing to financial considerations it was unable to assist with funds for starting a fishing industry. The Governor (Sir Frederic M. Hodgson) was, personally, in favour of something being done. That was three years ago. In May last year, Mr. Hunt approached him and asked if it would be possible to obtain assistance from the Department in starting an experimental fish-curing factory. Mr. Hunt mentioned the desirability of obtaining the present buildings. Eventually the Government of Barbados agreed to transfer them with the adjoining out-offices to the Imperial Department of Agriculture. The main building was 60 feet long and about 20 feet wide, and was well suited for the purpose in view. Since the building had been transferred, the Department had incurred expense in removing the partitions, re-arranging some of the out-buildings and other necessary changes and additions. A jetty had been provided for landing the fish, the fore-shore had been fenced in and a fish-scaling shed had been erected. Also water had been laid on from the mains of the Water Works Department. Altogether, with the aid of the funds of the Department, Mr. Hunt was now in a position to prepare and cure about 20 barrels of fish per day. That would mean something like 4,000 to 5,000 barrels per annum. It would be noticed that Mr. Hunt did not put up flying fish only. There were also albacore, dolphin, shark and dried sprats. The fish was either pickled, salted or dried. The Imperial Department of Agriculture was prepared to continue to give Mr. Hunt assistance from a scientific point of view and to furnish him with information, in regard to fishery matters, desired from other countries. Messrs. Hänschell & Co. were general agents for the factory ; but it had been arranged that merchants in Bridgetown, if they preferred it, could obtain their supplies direct from Mr. Hunt. Mr. Hunt at present had over 40 barrels of cured flying fish in stock. Each barrel contained about 600 fish weighing in all about 150 lb. It was estimated that cured flying fish could be delivered locally at about $4·00 per barrel, or at about one-half the cost of salted fish from Canada.

SUGAR INDUSTRY.

Grocery Sugars in Canada.

The following letter in regard to the condition of the sugar market in the Dominion of Canada, has been received from Mr. Alexander Wills, of Montreal, dated January 21, 1904 :—

In my last I advised you I would refer shortly to the position of British West Indian sugars in Canada. I have now pleasure in enclosing a copy of a circular letter that we have issued in the interest of the sugar shippers, in order to acquaint them with the conditions at the present moment existing in the Canadian markets for, especially, refining sugars.

The letter speaks for itself and we trust it will save some of our friends making losses, or at least minimizing them. It may place business on a better basis by having all sugars for this purpose *first* offered *direct* to Canada, and so free them from the depressing effects of being handled by New York brokers, who offer them in turn to our refiners under the market conditions created by the passing of the Cuban Reciprocity Treaty.

Grocery sugars are not thus affected and a good and growing market is to be found here. Montreal is the greatest centre for handling all classes of sugars and good results can be obtained for shipments here ; but this class of sugar must be shipped in bags or barrels, bags preferably, and *not* hogsheads. This package is of no use here and stops the sale of sugar.

I understand some proposals are being considered in Jamaica on the above subject, and if you can advise me on what is being done, I shall be greatly obliged.

Antigua Central Sugar Factory.

The following preliminary notice, signed by the Hon. Francis Watts, Chairman of the Central Sugar Factories Board, appeared in the *Leeward Islands Gazette* of January 21, 1904 :—

Under an agreement recently entered into between the Government of this Presidency and the owner of the Belvidere estates, arrangements have been made whereby sugar-canes grown by peasants, up to an aggregate amount of 1,500 tons in a year, will be purchased at Bendal's Works on the following conditions :—

Payment will be made for canes on a sliding scale, which will be published shortly. The price is never to be less than 7*s.* 6*d.* per ton for good canes.

Canes to be accepted must be clean, sound and ripe. They are to be delivered at Bendal's Works.

Peasants desiring to sell canes to the Bendal's Factory must give timely notice to the Manager of the Factory of their intention to send canes.

Detailed particulars, as to the conditions under which canes will be received and paid for, may be obtained on application to the Manager of Bendal's Factory or to the Chairman of the Central Sugar Factories Board.

Cane-farming in British Guiana.

The *West India Committee Circular* of January 5, after referring to the progress of cane-farming in Trinidad, gives the following account of what is being done in this connexion in British Guiana :—

For some time past efforts have been made to start a similar industry in British Guiana, but the conditions regarding drainage, transport, etc., in that colony have been such as to retard the development of cane-farming hitherto. It will be noted with satisfaction, however, from the figures given below, for which we are indebted to Mr. F. I. Scard, of British Guiana, that some substantial progress has been made during the past three years. The figures show :—

	1903.	1900.
Essequibo (including Wakenaam)	580	45
Demerara	308	26
Berbice	130	
	1,018	71

These figures represent the acreage of peasant farmers' canes dealt with by fifteen estates. The canes are mostly paid for by the punt load, at a price equal to about 8*s.* per ton, or by the gallon in one or two instances. Three estates adopt a sliding scale of price, according to the value of 96 per cent. crystals in Georgetown. Land for the purpose is provided by the estates in eight cases. In the Essequibo district and in one instance in Demerara, the managers speak encouragingly of the industry. The figures given do not include canes supplied in quantity by the employers of labour, but merely those grown by the individual exertions of the peasantry. The growth of the industry has been considerable, but it is much to be feared that the present low price of sugar will affect its immediate future very prejudicially. In Demerara the cost of canes, at 8*s.* per ton, to make a ton of sugar, would be somewhere about £5, leaving a loss to the manufacturer, while a reduction of price, in the present position of the industry, would, it is feared, effectually discourage the farmers.

BACTERIA AND THE NITROGEN PROBLEM.

A paper on this subject, by Mr. George T. Moore, Physiologist-in-Charge of the Laboratory of Plant Physiology, Bureau of Plant Industry, was published in the *Yearbook* of the United States Department of Agriculture for 1902.

The author first points out the importance of nitrogen to plants, which often overshadows that of potash or of phosphates, etc. He goes on to describe the ways in which nitrogen is lost, the principal being the waste due to modern sewage methods, the action of denitrifying bacteria, the washing out of soluble nitrogenous salts from the soil by rain, etc.

To supply this waste we have the supplies of nitrate of soda in Chili and Peru, which are, however, rapidly becoming exhausted ; the deposits of guano, which are also nearly exhausted, and the sulphate of ammonia obtained in the distillation of coal. There finally remains the nitrogen of the atmosphere. Many attempts have been made to combine this nitrogen with oxygen artificially, and to convert the compounds formed into nitrates, but none of them have yet been successful. Certain soil bacteria are known, which are able, while living independently, to fix atmospheric nitrogen. Attempts have been made to inoculate soils with these bacteria, but the results have not been uniformly successful, and the matter is still in an experimental stage.

There are, again, the bacteria which inhabit the nodules on the roots of leguminous plants. Leguminous plants possessed of these nodules are able to flourish and produce seed in soils, which are absolutely devoid of nitrogen, the necessary supplies of this element being taken from the air. There are, however, certain regions in which the soil does not contain the right kind of bacteria, and in which, therefore, no tubercles are formed on the roots of leguminous crops, and no nitrogen is absorbed from the atmosphere.

Cultures of these organisms have been prepared for the purpose of introducing them into the soil, the cultures being put up in tubes and sold as 'nitragin.' Cultures of special varieties of bacteria were prepared for each kind of leguminous crop. Here again, however, the results of inoculating the soil were usually disappointing. Investigations, made in the laboratory of plant physiology of the Bureau of Plant Industry, have led to better results. By the use of proper media artificial cultures have been made, which have proved quite successful in inoculating soils. The cultures are made on liquid media, which are soaked up in some absorbent material and then allowed to dry. These dry cultures retain their vitality for months. To use them, they are mixed up with a large quantity of water and the bacteria are left for a time to revive and multiply. The water containing the bacteria is then either applied to the soil, or the seeds to be sown are soaked in it before being planted. The trials have been made on a large scale, with very satisfactory results.

Practical Pollination. Mr. Davidson, of Fanners, Wickam Bishops, Essex, described an ingenious method of artificial fertilization of flowers as follows :—'I have adopted a method of economizing pollen, the ordinary camel's-hair brush being very wasteful. If a stick of sealing-wax be rubbed briskly on the coat-sleeve, as for electrical experiment, and then presented to the flower, the pollen flies to it and adheres. Every particle can thus be utilized far more easily than with a brush.' (*Journal of the Royal Horticultural Society*, October 1903.)

WEST INDIAN FRUIT.

GRADING AND PACKING FRUIT AND VEGETABLES.

The following is a brief summary of a leaflet (No. 98) recently issued by the Board of Agriculture and Fisheries on the subject of preparing produce for the market:—

Admirable and necessary as the highest cultivation must always be, yet something more is required to secure complete commercial success, namely, the conveyance of the produce in the best possible style to the market or to the consumer. It is at this point too many fail, and a material proportion of unprofitable sales is mainly attributable to neglect in presenting goods in the most satisfactory manner.

It is not sufficiently recognized how readily all fruits are injured by rough handling. Even hard, unripe apples and pears are soon bruised, and not only do these marks show as serious defects in the appearance of the fruits, but the keeping qualities are also affected. One general rule is applicable to all fruits, and that is, they should never, if it can be avoided, be gathered when they are wet, especially if they have to be packed for sending a long distance.

In grading fruits the points of importance are:—(1) freedom from injuries and blemishes ; (2) good size and even form ; (3) colour ; (4) high quality with ripeness. The first two are essential to all high-class fruits. The bulk of fruit grading will be mainly concerned with variations in size ; it is of the utmost importance to ensure that each grade be as uniform throughout as close attention can accomplish.

The essential rules in grading vegetables of all kinds are the following :—(1) Exclude all immature, overgrown, coarse or defective specimens from the leading grades. (2) Make each grade as uniform as possible. (3) Let freshness and fitness for use be the characteristics of all vegetables when consigned to market or consumers.

The best culture and most careful grading may lose all their value through neglectful packing. In dealing with fruits the essentials for success are as follows :— (1) Use only perfectly sound fruits. (2) Pack firmly, without crushing. (3) Use the best, elastic, odourless materials as packing. (4) Place all choice and ripe fruits in small quantities and shallow packages.

Various materials are available for packing purposes, but much the best are the several grades of wood-wool now prepared, the coarsest being suitable for large packages and heavy fruits, and the finest, softest samples for the choicest and ripe fruits. All choice and delicate fruits should be encircled with bands of folded, soft, tissue paper, having a glaced surface, which must be in contact with the fruit.

In the matter of branding or labelling, a grower should adopt a uniform system and adhere to it, so that his brand may become known and have a market value, and every package ought to have the name of the variety and quality boldly printed on the label.

THE CASHEW TREE.

In forwarding an extract from the St. Thomas *Mail Notes* of January 25 on the cashew tree (*Anacardium occidentale*) Dr. John Hutson, of Barbados, suggests that as this tree grows well over the St. Andrew's hills in Barbados, it might be worth while to make use of its products.

The extract shows that American botanists are of opinion that the cultivation of the cashew should be encouraged in Porto Rico for the following reasons:—

1. No other nut can compare with it in delicious flavour. Candy manufacturers have a good thing in this nut.
2. The kernel yields a nutritive oil, equal to almond and superior to olive oil.
3. The gum is of special value being sub-astringent and specially obnoxious to insect life. The mucilage is therefore useful for book-binders.
4. The juice from the trunk is an indelible ink.
5. The bark is useful for tanning.
6. Acids obtainable are valuable as stimulants, anæsthetics and lotions. One of the oils is a substitute for iodine.
7. Valuable as a cosmetic, will remove tans.

TROPICAL FRUITS IN ENGLAND.

It is recorded that among the chief attractions of the London fruit market at Christmas time were custard-apples, avocado pears, and persimmons. Custard-apples and avocado pears were of excellent quality, and the prices ran from 12*s.* to 18*s.* per dozen fruits, wholesale. The deep orange-red persimmons were selling at 3*s.* a dozen. It is probable that most of these fruits came from Madeira and the Canaries, though the persimmons may have come from the United States, where they are grown to a considerable extent. The persimmon is a Japanese fruit that is very little known in England, but it is commonly cultivated in the United States, being usually propagated by collar-grafting upon seedlings of the native species (*Diospyros virginiana*).

COTTON.

Cotton Disease in Montserrat.

The following is the report of Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, on his investigations relating to the leaf-blister mite which has been causing so much damage to cotton in Montserrat:—

During my stay in Montserrat I visited cotton fields in all districts of the island with the view of obtaining any new facts as to the present distribution, the probable origin, and the seriousness of the infestation in different localities. In addition, a considerable share of my time was spent at Dagenham estate and vicinity and at the Grove Experiment Station, studying the development of the disease since my previous visit and devising and arranging the details of systematic experiments for its control.

Dagenham estate is on the leeward side of the island; here where the leaf-blister mite was first noticed, the damage from its ravages has been more serious by far than in any other part of the island. Mr. Watson, the Attorney, informed me that the yield of cotton from 130 acres will be no more, and probably considerably less, than that obtained from 30 acres the previous crop. In several fields the cotton was being up-rooted and burned. These fields, under normal conditions, should have gone on bearing for two months longer. At Dagenham there was a serious outbreak of the cotton worm in October, and in several large fields all the leaves were eaten off except those which were attacked by the leaf-blister mite. These mite-infested leaves were so distorted and deformed that they were of no use to the plants, and the mites from them infested the new leaves as fast as they were produced, making it especially difficult for the plants to recover. On other estates, fields, which were entirely defoliated by the caterpillars and which were not infested by the mite, made good recovery, and at the time of my visit gave promise of fair crops. The fields that were first attacked suffered most or they were completely destroyed first.

On the windward side of the island the leaf-blister mite is to be found in nearly every field of cotton. At Trants, fields, which were in bearing and were slightly infested at the time of my visit in September, had in January just finished an excellent crop. I was informed that these fields would soon be cleared and the plants burned without any attempt to produce a ratoon crop. Certain fields at Bethel and Whites are infested but only in spots, and these spots for the most part are on the windward side of each field.

In the northern part of the island several fields of cotton were visited belonging to the Montserrat Lime Juice Company. These were slightly infested in each case, and as in other cases, nearly always at the windward side of the field. In the south part of the island the same condition was found, the infestation was slight, and on the windward side of each field, showing that the pest had been carried by the wind, and indicating that the mite in each case comes from outside the cotton field.

One of the most common of the Montserrat wild plants is the shrub known as *Acacia arabica*. . . . . This plant is very seriously infested by a mite, which causes small, sub-globular galls on the leaflets and peculiar, irregularly shaped blisters on the young tender wood of branches and newly formed spines. The mite is very similar to the mite of the cotton, but a little smaller (see *West Indian Bulletin*, Vol. IV, p. 282). The galls on the leaflets are not at all like those on the cotton leaf, but where the wood is attacked, very much the same effect is produced, as that noticed on the tender stems of cotton. It frequently happens that several galls occur upon a single leaflet and sometimes on both upper and under surfaces.

The galls are generally distinct and do not run together to form irregular, distorted masses, except upon the stems and spines where they frequently occur.

At Dagenham, there are no Acacias growing very near the cotton fields in which the *Eriophyes* was first discovered, but in every case of recent infestation, as noticed at this visit, infested Acacias occurred in greater or less numbers to the windward and generally at a very short distance. In spite of these facts it is not possible to say definitely that this mite has come from the *Acacia* to infest the cotton. . . .

The remedies for the cotton leaf-blister mite are still in the experimental stage. The experiments, which were commenced at the time of my visit to Montserrat in September, were discontinued on account of unfavourable weather conditions. Mr. Jordan, however, carried out some experiments along similar lines, and his results indicate that a mixture of lime and sulphur in equal parts, dusted on the plants, will help to control the pest. During this recent visit to Montserrat I arranged for two series of experiments, which should give more conclusive evidence as to the value of different insecticides in controlling this pest. One of these is a field experiment, for which Mr. C. Watson kindly provided ½ acre of land, which he had put in good condition for planting, and he promised the necessary labour for planting and for the application of the insecticides. The other series consists of several box experiments at the Grove Experiment Station. Mr. Jordan has undertaken the supervision of these, as well as the infestation experiment. It is hoped that these experiments will give results sufficiently definite to be of service in the preparation for the next crop of cotton. A report giving details of the experiments, the observations, results and conclusions, will probably follow in due course.

Nothing has been added to the knowledge of the life-history of *Eriophyes gossypii* during this visit. The working out of this life-history would require several weeks of continuous investigation, and knowing that the necessary time was not available for this purpose, I devoted myself to the investigations as given in the preceding paragraphs.

The following is a brief summary of this report with some conclusions that may be of more or less interest:—

(a) The cotton leaf-blister mite has increased in severity in those fields, where it was already established, and has appeared in the cotton fields in all parts of the island.

(b) The attack of the cotton worm greatly added to the injury by the mite in badly infested fields.

(c) The appearance of the mite in recently infested fields indicates that it may have come from the common wild *Acacia*.

(d) Weather conditions, during the past season have been rather unfavourable to the cotton, and consequently it suffered more from the attacks of the pests.

(e) Considerable time is required after infestation before the attack becomes a menace to the crop. Ordinary conditions of clean culture and the careful destruction of all plants growing in cotton fields, at the end of the crop season, will probably keep the pest within reasonable bounds.

(f) Experiments now in progress should demonstrate remedial measures of value in the cultivation of succeeding crops.

BEE-KEEPING.

West Indian Honey on Royal Mail Steamers.

In a recent letter to the Superintendent of the Royal Mail Steam Packet Company at Barbados, the suggestion was made by the Imperial Commissioner of Agriculture that a supply of 'comb honey' might be obtained from St. Lucia, Dominica, Montserrat and other islands in the West Indies for the use of passengers on the transatlantic and intercolonial steamers. It is understood that Jamaica honey is entirely used on the steamers of the Imperial Direct West India Mail Service, and there is no doubt that its use serves to bring this product to the notice of the public.

The following communication, forwarded by Commander Owen, R.N.R., will show that the suggestion has been readily adopted, and it is to be hoped that the interests of West Indian bee-keepers will thereby be enhanced:—

Attached please find a copy of a circular to Pursers of the intercolonial steamers directing them to obtain honey at the Leeward Islands and have it placed on the saloon tables. It may be useful for suppliers to know that the proper channel for obtaining supplies, according to the latest regulations, is through the Company's Agents. If it proves a success, I will ask our Provedore Manager at Southampton to have it advertised on board the transatlantic ships.

The following preserves and pickles, made in Barbados, are now advertised on board all the Company's West Indian mail ships:—Guava jelly, guava cheese, pine-apple jam, shaddock rind, limes in syrup, hot sauce, mountain cabbage and pepper essence.

[*Circular.*]

Honey forms one of the minor industries in the Leeward Islands and it is considered by the Imperial Department of Agriculture that the Company's ships could be the means of advertising and so encouraging it. At the same time it might be appreciated by passengers; some of them are certain to like it and perhaps prefer it to jam or marmalade. While it is desired to have it placed on the saloon tables for the above reasons, the Company is not to be put to any more expense than would be incurred by adding another brand of jam or pickles to our store list. The Barbados industries of guava jelly, guava marmalade, pickles, shaddock rind, mountain cabbage and preserved limes are now regularly advertised on board all the Company's West India mail ships and it is desired to do the same for the honey industry. It is obtainable at St. Kitt's, Montserrat and at St. Lucia.

Please give your attention to the above and report the results to me after a fair trial, for the information of the Company.

It would be well if bee-keepers in the various islands were to communicate with the Company's Agents, as advised above, with a view to enabling this experiment to be carried out successfully.

THE SUNFLOWER AS A CROP.

In the January issue of the *Journal of the Jamaica Agricultural Society*, Dr. James Neish gives his experiences in the cultivation of sunflowers as follows:—

To grow the sunflower beneficially as a crop, it should be planted in the spring-time of the year. During the past year the writer has carried on experiments, which show that when this seed is sown during the later and hot months of the year, in our tropical climate, the yield is diminished as compared with the yield obtained from a crop sown in February or March. It would, indeed, appear that as this plant is naturally a plant growing to advantage in temperate latitudes, we should adapt it to much similar conditions, and plant at that period of the year when vegetation first awakens, namely, in February or March. The sunflower then grows into a tall stem and bears a large flower at its summit. This is the characteristic growth of the Russian sunflower. The seeds in the large, single flower are well developed under attentive cultivation, and such seeds are well adapted for preservation, and may be depended on for growing succeeding crops. As already stated, the early crop not only gives a better yield, but the quality of the early crop is improved.

On the contrary, our late-sown crops gave smaller plants, and they rushed into flower and seed before attaining a proper growth, the flowers being small, and the seeds being comparatively worthless. It has been shown that late-sown crops are not advantageous. It would appear that the high temperature of the later months stimulates the plants into permature flowering and seeding.

The sunflower requires a rich and well-worked soil; the plough and Assam fork are the implements to employ, and the soil should be made fine for a seed-bed. The modes of seeding and cultivation should closely resemble those of Indian corn. If the hoe be used, shallow excavations should be made in straight lines, 3 feet apart, and not more than three seeds should be dropped in the excavations, taking some care to drop the seeds widely apart; they should be properly covered with fine moist soil and the soil compacted sufficiently to guard against birds, and also to ensure germination. During the growth of the plant it should receive attentive hoeing. On the large scale this may be done with the cultivator, but some hand-hoeing will also be necessary close to the stem in order that all weeds may be destroyed. The plant quickly responds to attentive hoeing, and the careful cultivator will find it to his interest to give a frequent hoeing so as to keep the plant in active growth. During growth the sunflower seems to have few enemies. Fowls should be kept away, otherwise they soon acquire the habit of flying up to the seed-head and eating out the seeds. After the seed is harvested, however, the grower must beware of rats; the seed should be stored in rat-proof bins, after thoroughly drying the heads.

In Jamaica the value of the sunflower as a crop will be found to consist in furnishing a plentiful supply of nectar to bees, and the seeds are most serviceable as a food for fowls, which rapidly get fat on this food when they are fully grown. The white seed is said to give a better quality of oil, but in our experience the grey-seeded sort gives a greater yield of seed. It is advisable to procure the grey Russian seed from a dealer. A very good sort of this kind was obtained locally from the agent of Burpee, of Philadelphia, the crop from this giving the best return.

The object of this communication has been to suggest early planting as the best to command success.

CULTIVATION OF TEMPERATE FRUIT IN THE WEST INDIES.

A reference is made in a recent issue of the Demerara *Daily Chronicle* to the efforts which have been made to cultivate English fruit in that colony. With regard to the attempts of the Mayor, Mr. E. A. V. Abraham, and Mr. M. A. Perreira, of the firm of Messrs. J. P. Santos & Co., in this direction, the *Daily Chronicle* states :—

'Mr. Abraham has succeeded fairly well with cherries, which are giving fruit at the present time, but not considering the trees sufficiently grown, Mr. Abraham is taking off the blossoms. Mr. Abraham has also succeeded with pears and peaches, and an American apple tree he planted is now well grown, although it is considered doubtful whether it will ever yield fruit. Several experiments made by Mr. Perreira went well until the trees reached the size that Mr. Abraham's has attained, but the plants died after this. Mr. Perreira's efforts with strawberries have been better rewarded. He has several beds in fruit at present, and encouraged by the size and quality of his strawberries, he has decided to extend his cultivation.'

In other parts of the West Indies the question of growing temperate fruit, although never amounting to anything like an industry, has, also, from time to time occupied the attention of those having estates at high elevations where the climatic conditions are suitable for the growth of such plants.

Thus, in Dominica it is recorded that Mr. George Snyder and others have obtained fruits of English apples and strawberries at elevations of 2,000 feet and upwards. In Grenada, Dr. William Laing has obtained similar results with apples at Richmond estate; at St. Lucia, strawberries have been successfully grown at the Botanic Station at sea-level, and from other islands in the Windward and Leeward groups we learn of more or less successful sporadic attempts in this direction. At Jamaica, according to the Annual Reports of the Director of Public Gardens and Plantations for the years 1897 and 1898, such temperate fruits as figs, peaches, apples, pears, plums and Himalayan raspberries, planted at Resource Orange Garden, at an elevation of between 3,000 and 4,000 feet, grew well and, in the case of apples, are said to have 'borne good crops of fruit.'

The chief difficulty experienced in the cultivation of temperate fruits in the tropics is that of checking the continuous growth of the trees during the winter months, November to February, when plants of all kinds in northern climates enjoy a complete rest. At Jamaica attempts have been made to imitate this condition of plant growth by removing the soil from around the roots during those months and replacing it with the return of spring. The plan has however not given satisfactory results in the case of any stone fruit—peaches, plums, etc.

With the exception of strawberries, which, as already mentioned, have been found to grow and bear crops at low elevations, it may be assumed from the foregoing, that on small areas at high elevations in these islands the cultivation of temperate fruits on a limited scale is possible. At the same time it is doubtful if it could be made remunerative as an industry. Elevation must always be the main feature in determining the success or failure of such experiments.

AN ABNORMAL ORANGE.

A description of an abnormal orange found growing in British Guiana was given in the *Agricultural News* (Vol. II, p. 201). In that case part of the fruit had the appearance of a sour orange, and part that of a sweet orange. Fig. 5 shows another abnormal orange, obtained through Mr. J. R. Bovell from Mr. H. T. Carrington, of Welches plantation, Barbados. On being dissected this fruit was found to have a very peculiar structure. There appeared to be two placentae—one thick and displaced towards one side, while what was apparently the second formed a band across the long diameter. The cells were arranged irregularly—most appeared to radiate from the band, the seeds being all in its immediate neighbourhood.

FIG. 5. AN ABNORMAL ORANGE.

It is difficult to say whether the two placentae have arisen from two ovaries, or whether one placenta is merely adventitious and of later growth.

Another possibility is that the former of these apparent placentae is not a placenta at all, but merely of the nature of a thickening of the rind due to some injury, or, if this is a twin fruit, a remnant of what might have been a dividing wall between the two.

MACHINERY FOR SALE.

A horse-power driving gear, recently imported into Antigua, is offered for sale. This could be used for driving any machinery, such as chaff cutter, corn mills, etc. It can be worked by any number of horses, from one to four, so that the power generated will depend on the number of horses employed.

This part of the machinery cost £11 10*s.* 3*d.*, and the proportion of importation charges amounted to £1, making a total of £12 10*s.* 3*d.*

The following is the description, taken from the catalogue of Messrs. Hobson and Co., 17, State Street, New York :—

Hobson & Co.'s Iron Frame Horse Gear, No. 14. This is a very compact, high speed, all iron gear, perfectly adapted for driving light threshing machines, cross-cut wood saws, feed cutters, grinding mills, etc. At the ordinary walking gait of a horse, it will develop 200 revolutions per minute on the tumbling shaft. The diameter of the band wheel is 25 inches, with 4-inch face, but any other diameter will be supplied to order. Price, $65·00. Weight and measurement :—seven packages containing one complete machine, gross weight, 1,235 lb; cubic measurement, 42 feet.

Applications should be made to the Hon. Francis Watts, B.Sc., Government Analytical and Agricultural Chemist for the Leeward Islands, Government Laboratory, Antigua.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 63 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

Vol. III. SATURDAY, FEBRUARY 13, 1904. No. 48.

NOTES AND COMMENTS.

Onion Seed.

With the view of securing a supply of selected onion seed for planting this year in the West Indies, it is desired that orders for such seed (specifying whether white or red onion seed is required) should be handed in to the local officers of the Department not later than Saturday, February 20 next.

In any case it is important that all orders for onion seed should reach the Imperial Commissioner of Agriculture not later than February 27. The seed so ordered would be specially selected for the Department, and it is hoped it will arrive in the West Indies about August next. It is urged that during the next season all the onion seed should *be planted in beds*; and when large enough the seedlings should be transplanted into the field.

Muscovado Sugar.

The following extract, taken from a recent book on Jamaica, exhibits a singular confusion of ideas in respect of West Indian sugar :—

> One rejoices to hear that the refiners of sugar in America are beginning to be nervous, lest, in consequence of the coming abolition of the Continental bounty system, the British West Indian sugar should find its way to the markets of the mother country. There is a special cane, called Muscovados, which to the American refiners is indispensable, and which apparently comes in greater bulk from our colonies.

As is well known, 'muscovados' is not a special cane, but a term applied to a class of *sugar* made by what is known as the muscovado or open-pan process of evaporation.

Cotton Seed.

In support of what has been already mentioned in regard to the importance of obtaining the best quality of cotton seed for the West Indies, we quote as follows from a report by Mr. George P. Foaden in the *Journal of the Khedivial Agricultural Society* (Vol. V, p. 178):—

> 'The question of the selection of seed for planting is one of very great interest; in fact it is one that cannot be overlooked. The choice of good seed is essential to the production of good staple cotton.'

Rendering Plants immune against Fungus Parasites.

In an interesting article in the *Journal of the Royal Horticultural Society* for October 1903, Mr. George Massee, F.L.S., suggests a method whereby cucumber and tomato plants may be rendered immune against fungus parasites. Mr. Massee has in view plants grown under glass, but it is not improbable that similar results would follow the treatment of plants grown in the open air in the tropics.

It is recommended to begin watering the young seedlings (when a fortnight old) every third day with a solution consisting of 1 oz. of sulphate of copper dissolved in 50 gallons of water. After treating for six weeks as above, commence watering every fourth day with a solution containing 1 oz. of sulphate of copper in 35 gallons of water. The sulphate of copper should be pure, and rain-water should be used, if possible.

It would be useful if experiments were tried, along the lines indicated above, on cucumber and tomato plants at the various Botanic Stations in the West Indies, and the results carefully noted.

Cacao Cultivation in Lagos.

The *West African Mail* of December 18, contains a report by Mr. E. W. Foster, Curator of the Botanic Gardens, Oloke Meji, on the cultivation of cacao. The following is a brief summary of the report :—

Cacao should be planted in deep, moderately rich, loose clay, such as is found on the banks of streams. Dry rocky soils, stiff clays, and soils exposed to strong wind or sea breeze should be avoided.

Care should be taken to select seed from the largest pods of heavy-bearing trees. These should, if possible, be trees far removed from inferior varieties in order to avoid variation resulting from cross-fertilization. The aim of the planter should be to plant trees of only one variety so as to secure beans of one size and quality.

The nurseries should always be placed near water and well protected from wind and direct sunlight. After sowing, the beds should be kept shaded and be watered when necessary; transplanting must be carried out with great care to avoid injuring the roots. The cultivation will have to be weeded about three times a year; this can be done with the hoe at first, but afterwards the weeds should be kept down with a cutlass, since the hoe is apt to injure the surface roots.

Jamaica Soils.

An instructive lecture on 'The Cultivated Soils of Jamaica' was recently delivered to the teachers undergoing the annual course of agricultural instruction in Jamaica by Mr. H. H. Cousins, M.A., F.C.S., the Government Analytical and Agricultural Chemist. The following is a brief summary :—

When Mr. Cousins first went to Jamaica the idea was given him that most of the soils were so exhausted by long cultivation that his business was to prescribe some medicine that would improve them. His work at the laboratory very soon showed him that this was far from being the case. In most instances the factor that limited the growing of crops in Jamaica was not so much the supply of plant food as the supply of water. It must be recognized that if maximum crops were to be obtained, every possible means of saving water must be adopted.

They must endeavour to get all the small proprietors to feed their stock on their back lands, collect manure and concentrate it on their cultivated lands, and then they would find their soil becoming richer and richer every year.

Mr. Cousins then urged the teachers to put the knowledge they had gained during the course to the best possible advantage. They must aim at teaching the main points with regard to cultivation by illustration in the school garden.

Crop Prospects in Dominica.

The following is a brief summary of an interesting and satisfactory report by Mr. J. Jones, the Curator of the Botanic Station at Dominica, on a recent visit to the windward district of that island :—

As in other parts of Dominica, limes form the most important crop in this district. The trees are rapidly recovering from the attacks of scale insects, which did considerable damage in the early part of 1903. This is probably due to the rapid increase of their natural enemies, assisted, no doubt, by the heavy rainfall of the latter half of the year. Planters should provide themselves with spraying outfits and be prepared to deal with the pests immediately they appear. It is satisfactory to note that greater attention is now being paid to pruning in the windward district, with the result that there are fewer fungus-infested trees.

The cacao in this district is young and, on the whole, doing well. The Curator lays stress on the necessity for planting wind-breaks in exposed situations, and advocates close planting. The cacao experiment plots appear to have served a good purpose.

Castilloa rubber trees have been planted as shade trees for cacao at Stowe estate, and as they resist the wind well, seem to be specially suited to the purpose. Experiments with Para rubber (*Hevea brasiliensis*) and Lagos silk rubber (*Funtumia elastica*) have not given good results, being easily uprooted by the gales. At Belvidere, at an elevation of 800 feet, several acres of *Funtumia* have been planted. If the experiment proves a success, the cultivation will be extended.

Natural versus Artificial Indigo.

A circular has recently been issued by the Reporter on Economic Products to the Government of India dealing with the present state of the trade in indigo between India and Allepo.

Between 600 and 700 chests of indigo are imported into Allepo from India every year. On account, however, of the competition of German synthetic indigo, this is usually sold by the merchants at a loss. This synthetic indigo has two advantages over the natural product, viz., that it is cheaper and that its price does not vary.

It was generally thought that owing to these advantages natural indigo would be entirely replaced by the synthetic. That this has not happened is due to the fact that synthetic indigo has not the same smell as that to which the native dyers are accustomed, who are therefore prejudiced against it. Moreover, cloth dyed with it alone fades in about two months. The consequence is that the two forms are mixed in about equal proportions, the resulting mixture being more durable and also brighter in colour than the natural indigo.

On account, however, of the impetus that has been given to the dyeing industry by the popularity of this mixed dye, much more indigo is used than formerly, and the reduction in the demand for natural indigo has not been nearly as great as might have been expected from the facts mentioned.

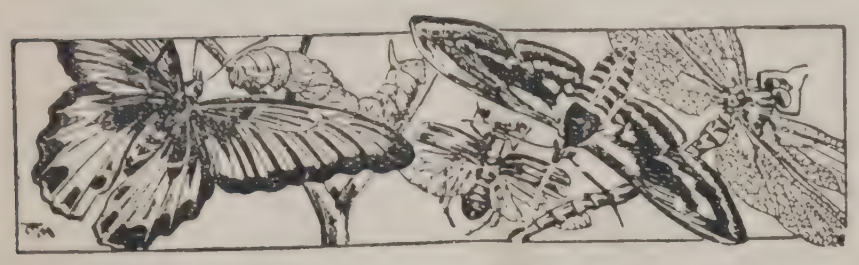
Exports of Grenada.

The recently issued *Colonial Report on Grenada* for 1902 bears testimony to the satisfactory state of the trade in local products. The exports were in excess of those of 1901 as well as of the average for the five years preceding 1901.

The tables show that during the last five years there has been a steady increase in the exports of these products. The crop of cacao for 1902 was 61,285 bags (valued at £268,211), as against an average, for the five years ending September 1901, of 53,379 bags. This satisfactory increase is attributed to improved methods and extended cultivation as a result of the efforts of the Agricultural Instructor and the lessons taught by the experiment plots established by the Imperial Department of Agriculture.

Nutmegs and spices were exported to the extent of 6,839 cwt. (valued at £25,522). This is an increase of more than 2,000 cwt. over the average for the previous five years, but the prices were not as favourable as in 1901, and there is, therefore, a decrease in the value of the spices exported.

In the case of cotton an increase is also recorded. The average export for the five years was 2,095 cwt. of raw cotton and 4,537 cwt. of cotton seed of the average annual value of £3,605 ; in 1902 the exports were 2,212 cwt. of raw cotton and 4,536 cwt. of cotton seed, valued at £4,069. As stated in the last issue of the *Agricultural News* (p. 44), the cotton and cotton seed are exclusively the product of Carriacou, a dependency of Grenada.



INSECT NOTES.

The Experiment Station at Montserrat.

The following is a brief report by Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, on the condition of the Grove Experiment Station at Montserrat in relation to insect pests. It will be seen that nothing of the nature of a serious insect attack has occurred at the Station and that every effort is made to keep the plants free from pests :—

The general condition of the plants in the gardens and nurseries was very good : very few insect pests were found and these, with one exception, were well-known forms and in very small numbers.

A few plants in the nurseries, attacked by species of *Lecanium* and the Black Line scale, which had been left over in the nurseries, were taken out and destroyed.

The only new insect found at the Botanic Station was a species of Bagworm, feeding on the leaves of the grape fruit. Several specimens were taken but all died while still in the larval stage, and so far I am not acquainted with the adult insect. Spraying with Paris green will serve to keep this insect under control.

In the report of my visit to Montserrat in May 1903 (*Agricultural News*, Vol. II, p. 248) I mentioned a hedge of lime trees at the Station which had been sprayed. At the time of my last visit, this hedge had not received the second spraying and showed only slight re-infestation.

The trees are remarkably healthy and vigorous, and their freedom from scales indicates what might be accomplished by careful spraying.

The spraying apparatus at Grove Station consists of two Knapsack sprayers and several Atomizers. A good stock of insecticides is kept on hand. Mr. Jordan is trying some experiments with crude sulphur from the local Soufrière, for insecticide purposes, and this will also be tried in the leaf-blister mite experiments.

Onions in Montserrat have been attacked by two species of caterpillars, and this with the unfavourable weather will probably somewhat reduce the crop. The caterpillars differ from the so-called onion moth in that they do not live inside the leaf. One of these is a moth larva, the adult of which I have not been able to obtain, and the other is a butterfly larva not determined, but probably *Pieris* sp. These are easily found in the very early morning or late in the evening. As soon as the sun is on the onion plants it is very difficult to find them as they evidently hide in, or on, the ground during the day and come out again to feed after sunset. These pests cause the leaves to turn a greyish brown, and the field takes a dry look as if some leaves were ripening prematurely. The larvae seem to be alike in eating only the outer epidermis and the soft tissues leaving the inside epidermis to wither and turn brown. Spraying or dusting with Paris green will probably prove a simple and effective check for this pest. I was unable to find any Thrips on the onions.

FOREST RESERVATIONS IN TOBAGO.

A letter was recently received by the Imperial Commissioner of Agriculture from Dr. J. C. Gifford, who has for some time been working on forest reservations in Porto Rico, mentioning that he had found an old map of Tobago, made before Queen Victoria's time, on which was marked a forest reservation. Dr. Gifford stated that it was labelled 'Reserved in Woods for Rains,' and asked to be furnished with further information relating to these tropical reserves.

The Government of Trinidad, on being communicated with, furnished reports on the subject by Mr. F. Lodge, of the Indian Forest Service, and Mr. C. S. Rogers, Forest Officer in Trinidad, and mentioned that forest reserves are now being laid out on all the mountain ridges in Trinidad.

Mr. Rogers' account of the Tobago rain reserve is as follows :—

The reserve in Tobago referred to by Dr. Gifford was, until 1903, merely a tract of land reserved from sale and marked on the map. It included little more than the top of the main ridge of the Central Range of the island ; its area was given as 2,500 acres. I find that its area by planimeter is 5,200 acres.

In 1900, Mr. Lodge, Deputy Conservator of Forests of the Indian Forest Service, reported on Forest Conservation in the colony of Trinidad and Tobago. He recommended that the Tobago rain reserve should be enlarged so as to include the catchment areas of the streams which rise in the Central Range. A copy of Mr. Lodge's report would doubtless be of interest to Dr. Gifford.

In 1901, Mr. Rogers, of the Indian Forest Department, was appointed Forest Officer in the colony of Trinidad and Tobago. He visited Tobago in the following year and in order to carry out Mr. Lodge's recommendations proposed a new boundary for the Tobago reserve. This boundary is a line parallel to the main ridge of the island at a distance of $\frac{1}{2}$ mile from it on the northern, and 1 mile from it on the southern side, connected by lines skirting the boundaries of private lands on the east and west.

These proposals were sanctioned and the boundary was ordered to be surveyed and marked out on the ground. The work is now in progress and it is expected that it will be finished by the end of February. The area is estimated at 10,000 acres. The map, from which the area of the old rain reserve was calculated by planimeter, is that in use in the Crown Lands Office.

A Victim of the Mosquito Plant. Under the above heading a correspondent of the *Madras Mail* records the results arising after having thoroughly rubbed his hands and face with the fresh leaves of the African mosquito plant (*Ocimum viride*). The mosquitos being still troublesome, as a further precaution, he crushed the stalks of the leaves, and well rubbed in the juice. At the moment the effect seemed successful ; but the next morning a rash appeared on his face which later on developed into rather painful blisters. The victim is now concerned to learn whether the juice of the leaves or the stalks caused the trouble. He has tried in vain to persuade his friends and the doctor to make experiments on themselves to settle this point, in the interest of science. 'For myself,' he adds, 'I am content to consider the efficacy of the plant as a mosquito-fuge sufficiently proved, but I am bound to confess I prefer the evil to the remedy'.

MULE-BREEDING IN TRINIDAD.

The following notes on mule-breeding at Trinidad have been forwarded by Mr. C. W. Meaden, Manager of the Trinidad Government Farm, to supplement those already published in the *Agricultural News* (Vol. II, p. 391) :—

Mule-breeding is quite a new departure in this island and should by all means be adopted, as the demand for such animals for all classes of work is very great and their cost to purchase consequently high.

An Andalusian jack was imported some two years ago ; he stands 14·2 hands high and possesses an excellent head and forehand ; his hind quarters are a little shallow, but this has not come out in his progeny yet. He has kept in good health and costs very little to keep, one feed of oats daily, with plenty of ripe Guinea grass, cane tops, etc.

Three foals were born in October 1902: these have done exceedingly well and shown satisfactory growth; they are hardy and full of life. Their measurements are—No. 1, 14·2 hands high ; Nos. 2 and 3, 13·2 hands high; girth taken close up to the forearm covering the vital organs shows on the first 58 inches ; on the two latter, 55 inches. Three others, born in September last, show equally promising growth: there are a dozen good mares due to foal about April next.

The feeding given to the mule foals after weaning is a mixture of fine pollard and cocoa-nut meal in equal parts—3 lb. per head each morning, costing 4 cents. They run day and night on the pastures with the other animals and graze as they like. The total cost of rearing and placing a 15·2-hand mule on the market I estimate to be about $90·00

Should the growth of these three mules continue, they may, at the age mentioned, equal the class of mule imported here from the United States, whose present market value is about $180·00 each. This price would leave a fair margin of profit, providing the business is conducted upon a sufficiently large scale.

Given good pasture land, the young mules might be brought up entirely upon grass until the time arrived for breaking them and thus reduce the cost of rearing. At this farm we are not able for the present to rely entirely upon grass for growth as the herbage is not sufficiently nutritious for the purpose. However, as time goes on the grasses under cultivation will probably become good enough to sustain the young animals during their early career.

To breed big mules to compete with Americans, big dams must be used : the best for the purpose may probably be the roadster, with a dash of blood in them. A 16-hand mare put to a 14·2 to 15-hand jack would produce just what is required to suit the general market.

The jack is sent round to the various country districts and Tobago, putting up at Police Stations. In this way he served eighty-one mares which is about the limit which should be permitted per annum. If the result of this is 60 per cent. of foals, the breeding of mules has taken a very good start. Every effort has been made to induce East Indian and peasant proprietors to accept the advantage of breeding their own mules. Their particular employment as general carters, cane-farmers, etc., makes it necessary to possess mules. They have, I am pleased to say, been our best customers for the service, very much to their future advantage.

EDUCATIONAL.

School Gardens in Trinidad.

As illustrative of the progress which has been made during the past few years in the teaching of practical agriculture in rural schools at Trinidad, the following extract from the *Colonial Report on Trinidad and Tobago* (pp. 8 and 9, par. 27) for the year 1902-3 is of interest :—

Practical agriculture now forms a part of the daily teaching in most schools in the colony. The institution of School Vegetable Shows has proved a decided success, the local committees having entered heartily into the work. The following extract from the Annual Report of the Acting Inspector of Schools, laid before the Legislative Council at its last meeting, is of interest :—

'Nearly every rural school has its tidy little garden, in place of the wilderness of weeds and rank grass formerly so much in evidence. In many instances the garden's sphere of usefulness is not limited to the supply of edible vegetables. but it serves also as a miniature experiment station. Here may be seen plants in various stages of cultivation, and perhaps even of uncultivation ; some flourishing in soil rendered rich by manures, side by side with others struggling for existence for want of such aid ; some lank and attenuated from overcrowding, others vigorous and healthy from being allowed ample room for growth ; some sun-exposed and pining for want of water, others delicate and weakly from a too liberal supply of both water and shade. In such a school garden (and I have several in my mind), the pupils are receiving one continuous object-lesson.'

Nature Study.

We take the following note on the establishment of a 'School Nature-Study Union' from *Nature* of December 10, 1903 :—

A School Nature-Study Union has been established to utilize and make better known facilities which already exist for encouraging the study of nature by pupils in primary and secondary schools, and to supplement by work in several new directions the efforts of existing associations. The prospectus of the Union states that it is proposed to promote addresses to children by supplying lantern slides and specimens to teachers desirous of giving lessons on natural objects, and by providing qualified lecturers where desired ; to assist in the organization of school rambles and journeys, in the establishment of school museums and in the arrangement of conferences and natural history field days. The inauguration of a junior department, of reading circles, of circulating libraries for teachers, is also contemplated, as well as the publication of an official organ. Sir George Kekewich, K.C.B., is the president, and the Rev. C. Hinscliff, Bobbing, Sittinbourne, is the hon. secretary of the Union.

Metric System. We learn from *Nature* of January 7, that a Bill has been introduced into the United States House of Representatives to enact that on and after January 1 next, all departments of the Government shall employ and use only the weights and measures of the metric system. In view of this and the efforts that are proposed to be made to introduce the metric system into these colonies, it would be well if this system were to form a subject of instruction in all West Indian schools.

GLEANINGS.

The lemon grass cultivated at Antigua has been determined at the Royal Gardens, Kew, as *Andropogon Nardus*, var. *genuinus*, Hack.

According to the *Consular Report on the trade of the Philippine Islands* for 1902, the export of Panama hats, chiefly to the United States, has attained considerable dimensions, the total value exported being about £35,000.

The *Consular Report on the trade of Charleston and District* for 1902 states that 11,937,406 lb. of bagging were imported at the ports of the district. This was principally used for baling Sea Island cotton.

According to a report from Nevis, dated January 26, some of the cotton fields in that island are turning out well, and about 50,000 lb. of seed-cotton are awaiting the erection of the gins, which are expected to be ready for working about the end of this month.

We are informed by the Curator of the Botanic Station at Tobago that it is estimated that 60 to 70 acres are under cotton cultivation in that island, and that, judging from the number of applications for seed made to the Botanic Station, there is every promise of this old industry being re-established.

The Antigua Agricultural and Commercial Society has recently passed a resolution suggesting that the Government should introduce a flock of Barbados blackbirds, in order to protect the cotton and other industries from the attacks of caterpillars.

According to the *Federalist and Grenada People*, the trade in oranges between Grenada and Barbados is becoming an important one. The mail, that arrived at Barbados on January 16, brought over 20,000 oranges, and a large shipment was also made by the following mail.

We learn from Dominica papers received by last mail that a second attempt is to be made to turn to a profitable account the Dominica sulphur springs, which are situated near Soufrière in the south-west corner of the island. Hitherto the sulphur has been exported in its crude form ; the new company will attempt to produce on the spot pure sulphur adapted to the trade requirements.

We learn from the *Consular Report on the trade of Costa Rica* that the area under banana cultivation continues to increase rapidly. The export of this fruit to the United States was begun in 1831, when 3,500 bunches were shipped. During 1902, 4,174,199 were exported to the United States ; while a monthly fruit service between Limon and Bristol and Manchester has become during 1903 a fortnightly service.

The Hon. Wm. Fawcett, B.Sc., F.L.S., Director of Public Gardens and Plantations in Jamaica, writes : 'The "Travellers Tree" (*Ravenala Madagascariensis*) has fruited regularly at Castleton Gardens for over twenty years, and seeds have been gathered for propagating purposes and for distribution.'

As stated in the *Agricultural News*, Vol. III, p. 3, arrangements were made by the Board of Agriculture in Jamaica to import cocoa-nuts from San Blas for planting, in place of those destroyed by the hurricane. We learn from the current number of the *Journal of the Jamaica Agricultural Society* that 20,000 nuts were ordered, and as this number was not sufficient to meet the demand, 10,000 more have been obtained.

According to a correspondent writing in the Demerara *Argosy* of January 27, 'the cheap Costa Rica banana is very popular in the midland counties [of England], and whilst in the large cities, such as London, Liverpool and Glasgow, the choicer Canary banana is the most popular and highest priced, the cheap Jamaica and Costa Rica fruit takes the lead in the midland cities and inland towns.'

Mr. C. H. Knowles, B.Sc., Acting Curator of the Botanic Station at St. Vincent, has reported on a visit of inspection to the Georgetown Experiment Station. A variety of crops is being grown at the Station and these were found to be in a satisfactory condition. The country round Georgetown is fast recovering from the effects of the disasters, caused by the volcanic eruptions, and is gradually becoming covered with vegetation.

It is interesting to observe from statistics given in the *Consular Report on the trade of Charleston and District* for 1902, that the exports of cotton (principally to the United Kingdom, Germany, Italy, Spain, France, Russia and Holland) show a steady decline during the last few years. The number of bales exported from Charleston, Savannah, Brunswick and Wilmington being as follows :—in 1900, 1,515,719 ; 1901, 1,374,291 ; 1902, 1,348,069. The exports of cotton seed, on the other hand, have greatly increased.

According to *Our Western Empire*, an attempt is being made to make molascuit a free import in Canada as are the various oil meals. 'The present duty on molascuit is 20 per cent. *ad valorem*, but subject, of course, to the preferential rebate of one-third. It is much more important at the moment that the West Indians, who supply molascuit, should be able to compete freely with other food-stuffs in the Dominion, than that they should have a preferential tariff as against molascuit supplied from any other quarter, and Canadian farmers should have every opportunity of obtaining this excellent cattle food.'

As is well known, the quotations in the public telegrams, received in the West Indies for cotton, apply only to Upland cotton, a variety which is not produced in these colonies. The variety, to which chief attention is devoted here, is Sea Island cotton. This is usually worth double the value of Upland cotton. At the request of the Imperial Commissioner of Agriculture, the General Superintendent of the West India and Panama Telegraph Company has been good enough to submit for the consideration of the Directors the desirability of substituting the quotations for Sea Island cotton for those of Upland cotton as likely to be of greater interest to cotton growers in this part of the world.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is a report by Mr. J. R. Jackson, A.L.S., on the London drug and spice markets for the month of December 1903:—

During the whole month of December, the reports of the markets in drugs and spices were characterized as more or less inactive. At the beginning of the month business was stated to be 'far from brisk' with but few changes of importance in any of the products for the preceding month. At the last drug sale of the year, which took place on December 10, nothing of special interest occurred; buyers, it was said, were 'holding back in view of approaching stock taking.' A week later, business both in drugs and spices was limited to immediate necessities, and on the 23rd., two days before Christmas, the markets were reported as 'practically at a standstill.'

Besides the actual business transacted nothing of any interest has occurred either in the appearance of any new product or fresh sources of supply. The following details respecting the produce of the West Indian Colonies will illustrate the state of the London markets generally during the closing month of the year, a condition that is with very little change of annual recurrence.

GINGER.

At the first spice sale on the 2nd. of the month, there was a slow demand for ginger, the rates for which were generally lower than in the previous month: 488 packages of Jamaica were offered and 216 sold, the prices ranging from 47*s.* 6*d.* to 50*s.* for middling to fair bright small; 41*s.* to 43*s.* for medium dullish, and 37*s.* to 38*s.* for ordinary to ordinary dullish. There was a slow demand for Cochin, good, small cut being sold at 38*s.* 6*d.* without reserve, and medium and bold bought in at 65*s.* A week later, namely, on the 9th., no Jamaica ginger was offered and Cochin was again bought in, including medium to bold cut, at 65*s.*; small, washed rough was sold at 26*s.*; fair was bought in at 28*s.*, and good, limed Japan sold at 24*s.* On the 16th., which was the last public spice sale of the year, no Jamaica was offered, but about 200 packages of Cochin were disposed of at the following rates:—Washed, rough wormy, 21*s.* 6*d.* to 22*s.* 6*d.*; damaged, 22*s.* to 25*s.*; white sound was bought in at 26*s.*, and small cut Cochin at 40*s.*

PIMENTO, NUTMEGS AND MACE.

At the first spice sale 70 bags of good pimento sold at 4*d.*, fair fetching $3\frac{7}{8}d.$, and greyish $3\frac{3}{4}d.$ A week later the prices showed a downward tendency, 209 bags selling at from $3\frac{5}{8}d.$ to $3\frac{3}{4}d.$ for fair. At the last sale, on the 23rd., the demand had improved at somewhat advanced rates, about 300 bags of fair selling at 4*d.* per lb.

West Indian nutmegs at the beginning of the month showed a slight decline on the prices of the previous month, without any appreciable change at the succeeding sales.

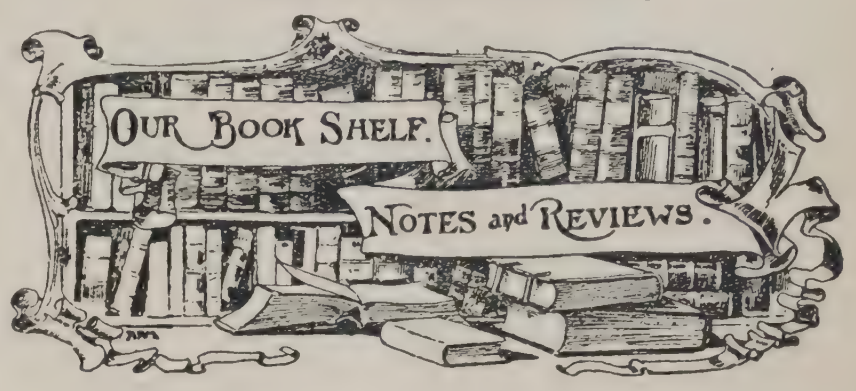
Mace also began the month at lower rates, West Indian selling at 2*s.* 4*d.* to 2*s.* 6*d.* for good; 2*s.* 1*d.* to 2*s.* 2*d.* for fair; 1*s.* 11*d.* to 2*s.* for ordinary, and 1*s.* 10*d.* to 1*s.* 11*d.* for broken. At this same sale Java realized 2*s.* 4*d.*

ARROWROOT, SARSAPARILLA, ETC.

No St. Vincent arrowroot was offered at the first sale, and 15 barrels of Natal were bought in at $6\frac{1}{2}d.$ At the sale a week later, 830 packages of St. Vincent were offered and bought in, good to fine manufacturing at $2\frac{1}{8}d.$ to $3\frac{1}{2}d.$ On the 16th., over 300 barrels of St. Vincent were sold without reserve at 1*d.* to $1\frac{1}{2}d.$ for common to ordinary.

Sarsaparilla occupied but little attention during the month, there being practically no demand. Three bales of Lima Jamaica, fair sound, were sold at 10*d.* at the auction on the 10th., and no sale was effected for the native Jamaica offered. A small quantity of Honduras was sold at 1*s.* 1*d.* per lb.

Of the other products it may be mentioned that 14 bales of fair, bright, West Indian *Cassia Fistula* were sold in the middle of the month at 30*s.* per cwt., and that good West Indian kola nuts realized $5\frac{1}{2}d.$ per lb.



A TREATISE ON CACAO (Theobroma cacao): By F. Emmanuel Olivieri. Trinidad: Mole Bros., 27, Chacon Street, Port-of-Spain. (3rd. Edition.) Price 5*s.*

This work on the cultivation of the cacao tree and the curing and preparation of the produce for market is stated by the writer to be the outcome of twenty years' practical experience. The author treats the subject entirely from the point of view of a Trinidad cacao planter, and while the book contains much that is of interest and value to cultivators in that island, the chapters devoted to shade trees, cultivation generally and manuring, describe methods which differ in some respects from those practised in Grenada and elsewhere in the West Indies.

Parts vii and viii deal chiefly with the Bois Immortel as a shade tree for cacao, its manurial value and its effect as a preserver of the fertility of the soil as compared with other trees grown in cacao plantations in Trinidad.

The chapters on insect and fungoid diseases of the cacao tree are of interest, as showing the importance which the writer attaches to the use of the remedial measures suggested by the Imperial Department of Agriculture.

The book is fairly well printed and illustrated, although in the case of the various types of cacao represented in the latter, the wood cuts would be of greater value were the local names given to each variety instead of the general terms 'Red' and 'Yellow' cacao, etc.

The purpose of the book is excellent, and to all who are practically interested in cacao we have no hesitation in recommending it.

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MARKET REPORTS.

London,—January 19, 1904. Messrs. Kearton, Piper & Co., Messrs. E. A. De Pass & Co. and Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', January 15, 1904; and 'The Public Ledger,' January 2, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/6 to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/3 to 1/8 per lb.
Balata—1/9 to 2/2 per lb.
Bees'-wax—£7 7*s.* 6*d.* per cwt.
Cacao—Trinidad, 68/- to 76/6 per cwt.; Grenada, 52/- to 62/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 58/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/2 per lb.
Coffee—Jamaica, ordinary, 38/- to 56/- per cwt.
Copra—Trinidad, £15 15*s.* to £15 17*s.* 6*d.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/2 to 1/3 per lb.
Divi Divi—No quotations.
Fruit—
Bananas—Jamaica, 5/- to 7/-.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 36/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/3 to 2/11; Cake, 1/3 to 1/7 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 9*d.* to 1*s.* 1*d.* per gallon; Concentrated, £13 to £13 10*s.* per cask of 108 gallons.
Lime Oil—Hand pressed (discoloured), 2/6; Distilled, 1/3½ to 1/4 per lb.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/10 to 2/6 per lb.
Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.
Nutmegs—69's to 60's, 1/9 to 2/3; 90's to 80's, 1/1 to 1/4 per lb.
Pimento—4*d.* to 4¼*d.* per lb.
Rum—Demerara, 9*d.* to 10*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—9½*d.* to 1*s.* per lb.
Sugar—Crystallized, 14/9 to 16/6 per cwt.; Muscovado, 11/- to 14/6; Molasses Sugar, 11/9 to 16/-.
Sulphate of Ammonia—£12 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—January 12, 1904.—'The Maritime Merchant.'

Molasses—Barbados, 34c. per gallon. Porto Rico, 40c.

New York,—January 22, 1904.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12c.; Caracas, 13c. to 14½c.; Jamaica, 10½c. to 12½c.; Grenada, 12½c. to 12¾c.; Trinidad, 13¼c. to 14½c. per lb.
Cocoa-nuts—Trinidads, $17·00 to $18·00; Jamaicas, $21·00 to $23·00 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7½c. to 8¾c. per lb.; Manchester grades, 10c. to 12c. per lb.
Ginger—Jamaica, 7¼c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Grape Fruit—$3·50 to $5·60 per barrel.
Oranges—$3·50 to $4·00 per barrel.
Pimento—7½c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3 11/32c.; Muscovados, 89°, 2 27/32c.; Molasses, 89°, 2 13/32c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 30, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$10·00 to $10·50 per 100 lb.
Cocoa-nuts—$9·37 per M. for unhusked nuts.
Coffee—Jamaica and ordinary Rio, $9·50 to $11·00 per 100 lb. respectively.
Hay—$1·10 per 100 lb.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00; Sheep Manure, $6·25 per ton (ex ship).
Molasses—16c. per gallon (puncheon included).
Onions—$3·25 to $3·42 per 100 lb.
Potatos, English—$2·00 per 100 lb.
Rice—Ballam, $5·10 per bag (190 lb.); Patna $3·60 per 100 lb.
Sugar—No quotations.

British Guiana,—January 28, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·50 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$11·00 to $12·00 per M.
Coffee—Rio and Jamaica, 13c. to 14c. per lb. (retail).
—Creole, 13c. per lb.
Dhal—$3·60 to $3·70 per bag of 168 lb.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.
Onions—4c. to 5c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
Plantains—20c. to 48c. per bunch.
Potatos, English—$2·70 to $3·00 per barrel.
Rice—Ballam, $4·60 per 177 lb., ex store; Creole, 18c. to 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·32 per barrel.
Tannias—$1·92 per bag.
Yams—White, $1·44 per bag.
Sugar—Dark Crystals, $1·85; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—January 28, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary, $13·00 to $13·50; Estates, $14·00 per fanega (110 lb.).
Cocoa-nuts—$16·00 per M., f.o.b., selected in bags of 100, (husked).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—55c. per Imperial Gallon (casks included).
Coffee—Venezuelan, 7⅞c. per lb.
Copra—$2·40 to $2·50 per 100 lb.
Onions—$2·70 per 100 lb.
Potatos, English—$1·00 to $1·25 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $5·25 to $5·75 per bag.
Sugar—No quotations.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 49. BARBADOS, FEBRUARY 27, 1904. PRICE 1*d.*

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Cotton Ginneries in the West Indies.

IT is very creditable that within the short period of eighteen months several well-equipped ginneries have already been successfully established in the West Indies.

The first ginnery was started under the auspices of the Imperial Department of Agriculture and the St. Lucia Agricultural Society at the Rivière Dorée Experiment Station at St. Lucia in 1901. This was placed under the charge of Mr. George Barnard, a responsible local planter, who has continued to take a great interest in cotton growing. The gin was a Dobson & Barlow single roller gin, the cost of which was provided by the St. Lucia Agricultural Society. A cotton press was added later by means of a grant from the Imperial Department of Agriculture. The gin was operated by a horse-power driving gear. Recently an aermotor has been erected by Mr. Barnard which is reported to be working satisfactorily. Two Macarthy gins, loaned by the British Cotton Growing Association, are in charge of Mr. H. D. Hunter, at the Dennery Sugar Factory on the windward side of St. Lucia. A hand-power gin, received from the British Cotton Growing Association, is for the present located at the Agricultural School at Union for the instruction of the pupils and use of the small settlers in the Gros Islet district.

The first ginnery operated by steam power in the West Indies was started at St. Kitt's on Canada estate (lately transferred to Spooner's), under the control of Messrs. Sendall & Wade, and managed by Mr. A. O. Thurston. This consisted of two single action gins and a tramping press driven by a Tangye horizontal steam engine. The first shipment of cotton from this factory comprised 12,000 lb. of lint. This obtained 13½*d.* per lb. in the Liverpool market.

A ginnery, also belonging to Messrs. Sendall &

Wade and operated by steam power, was started at Montserrat in the beginning of 1903. This, at present, consists of two gins and a screw press operated by an oil engine. Another ginnery, owned by Mrs. Howes, is in active work on the windward side of Montserrat. A third ginnery is in charge of Mr. Wilkins.

A Government ginnery, driven by steam power and containing one double action, single roller gin, was opened by Lady Morris at Barbados on July 31, 1903. This was re-opened, after considerable enlargement, by Sir Frederic Hodgson, K.C.M.G., on February 25, 1904. At present it consists of a 12 horse-power steam engine, six single action Macarthy gins (Platts) and a hand-power baling press. The cost of this factory is placed at about £900. Mr. J. J. Law was engineer in charge.

It may be added that Messrs. H. E. Thorne & Son, at Barbados, have a private ginnery in operation with two Asa Lees single action, single roller gins, and a screw baling press of their own construction. Both the gins and press are operated by steam power.

A Government ginnery, driven by an oil engine with three single action, single roller gins, (one Platts and two Asa Lees) and a hand-power baling press, was opened at Antigua by Lady Edeline Strickland on December 11, 1903. A hand-power gin, provided by the Imperial Department of Agriculture, has been in active use at Antigua for nearly two years.

What is likely to prove the largest and most effective ginnery in the West Indies is now in course of being erected at St. Vincent under the direction of the Imperial Department of Agriculture. Mr. J. J. Law is engineer in charge. The factory will be a three-storied building, 90 feet long, 27 feet wide, with a 12-foot verandah. There will be a lower or basement floor, a ginning floor and a cotton loft. The roof of the verandah opening out from the cotton loft will serve for drying the seed-cotton. The machinery will be operated by a Hornsby-Akroyd oil engine and consist of eight gins—2 Platts, 2 Dobson & Barlows, 4 Asa Lees. There are two baling presses; one is an exact counterpart of that used for packing Sea Island cotton in James Island, South Carolina. The latter was furnished by Messrs. Lebbey and Bailey, of Charleston, S. C. A hand-power gin is also available at St. Vincent.

Mr. E. Y. Connell, an enterprising engineer, is engaged in establishing a central ginnery at Nevis, where he will be prepared to deal with all the seed-cotton likely to be produced in that island. The engine and a gin have been loaned by the local Government. Two more gins are shortly expected to complete the outfit for the current season. All the gins are a contribution from the British Cotton Growing Association.

Two hand-power cotton gins and a press, are in course of being provided for use in the island of Anguilla. In the Virgin Islands a cotton gin and a press, contributed by the British Cotton Growing Association, are proposed to be operated by an aermotor similar to that in use at St. Lucia. A hand-power gin is provided for use, if necessary, in the out-islands of this group.

According to a Grenada newspaper 'cotton machinery is being erected by Mr. L. R. Mitchell on the northern side of the careenage, St. George.'

At Jamaica, a Macarthy single roller gin and baling press have been contributed by the British Cotton Growing Association for the use of growers in that island. They are proposed to be ready for use during the current year.

Hand-power gins and presses have lately been obtained for use in Trinidad and British Guiana. These are intended to be used during the crop season of 1904.

In regard to all these ginneries it is desirable to place on record an appreciation of the very active part taken in their establishment by the British Cotton Growing Association. The total value of the engines, gins and presses contributed by the Association cannot be far short of £700. It is understood that, unless otherwise agreed upon, the engines, gins and presses are to be regarded as on loan and to remain the property of the Association.

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

The following is the progress report, prepared by Professor Harrison, C.M.G., M.A., F.I.C., F.G.S., on the sugar-cane experiments at British Guiana for the half-year ended December 31, 1903:—

During the period under review the sugar-cane experiments have been carried on under my control, assisted by the advice of members of the Sugar-cane Experiments Committee of the Board of Agriculture. The actual conduct of the work has devolved upon Mr. R. Ward, Agricultural Assistant to that Board.

The months of July, August, September and October were occupied by the usual agricultural operations proper to the season. The canes made good growth during this period. During October and November examinations were made of some thousands of new seedlings raised from seed in 1900 and 1901.

The canes commenced to arrow late in August, No. 95 flowering freely towards the end of that month. It was followed by Nos. 74, 116, 2,028, 3,157, 3,287, 3,866, and the White Transparent, all of which were in flower during the first week of September.

Many other varieties flowered during September and October, but owing probably to the exceptional dryness of the weather, a large proportion of the arrows were abortive and remained arrested in their sheaths. Due probably to the same cause was the scarcity of fertile seeds produced this year. Two hundred and nine sowings were made and only 3,216 seeds germinated, the lowest rate for many years. About 2,500 young seedlings have been secured.

The most prolific variety was No. 115, followed by No. 1,087 and by No. 2,468. The White Transparent and the Bourbon proved the least fertile.

The cross-fertilization experiments again failed ; in the case of the White Transparent and the Mani completely, the two varieties not arrowing at the same time ; the experiment with these kinds will not be repeated : while in that of the White Transparent and the Po-a-ole only four plantlets have been obtained, which may or may not have resulted from cross-fertilization.

The following are the varieties cut on the North field, the average of canes per acre yielded by them and the indicated proportions of saccharose in the juices expressed from them by a laboratory mill :—

1st. RATOONS. 12 MONTHS OLD.

Nos. of canes.	Tons of canes per acre.	Pounds of saccharose per gallon in the normal juice.
625	47·75	1·756
116	39·4	1·783
130	30·1	1·888
95	22·65	2·149
145	39·7	1·958
109	35·6	1·857
78	35·1	1·709
115	34·5	1·870
74	28·7	1·888
3,956	34·4	1·816

PLANT CANES. 12 MONTHS OLD.

Nos. of canes.	Tons of canes per acre.	Pounds of saccharose per gallon in the normal juice.
B. 147	32·7	1·814
W. Transpt.	31·6	1·966
Bourbon	29·5	1·635
2,190	26·0	1·740

The average yield of the 1st. ratoon canes was at the rate of 38 tons of canes per acre, that of the plant canes 29·9 tons.

Similar details for the varieties planted on South field and reaped as plant canes seventeen months old are as follows :—

PLANT CANES. 17 MONTHS OLD.

Nos. of canes.	Tons of canes per acre.	Pounds of saccharose per gallon in the normal juice.
625	25·35	1·870
109	25·4	1·886
115	24	1·869
W. Transpt.	22·6	1·998

The average yield on this field was at the rate of 24·5 tons of canes per acre.

The effect of nitrogen on the canes was well shown, the results being in tons of canes per acre :—

Nos. of Canes.	No Nitrogen.	Low Nitrogen. (200 lb. sulphate ammonia per acre.)	High Nitrogen. (300 lb. and 400 lb. sulphate ammonia per acre.)
625	42·8	48·7	51·7
116	33·2	39	54·7
109	30·3	34·5	42
145	32·4	44·9	38·9
78	28·5	35·5	41·3
3,956	32·6	30·7	39·9
Mean	33·3	38·9	44·7
130	28·2	32	
115	29·7	39·2	
74	24·8	34·5	
95	19·2	26·1	
Mean	25·5	32·9	
PLANT CANES. NORTH FIELD.			
B. 147	30	33	35·1
W. Transpt.	30·2	37·5	37·1
Bourbon	27·4	28·9	32·2
2,190	20	21·3	33·8
Mean	27·6	30·2	34·5
PLANT CANES. SOUTH FIELD.			
625	22·2	23·6	30·2
115	17·7	25·8	28·7
109	18·9	26·8	30·6
W. Transpt.	15·6	23·6	24·8
Mean	18·6	24·9	28·6

These experiments therefore have produced singularly clear proofs of the dependence of the yield of the sugar-cane on the proportion of available nitrogen added in manures, and, with others previously reported, show that the various varieties of sugar-cane resemble the Bourbon in the dependence of their yield upon this constituent.

(To be continued.)

WEST INDIAN FRUIT.

AN ABNORMAL COCOA-NUT.

In the *Agricultural Bulletin of the Straits Settlements* for October last, Mr. T. F. Weld, District Officer at Kwala Selangor, gives the following interesting account of an abnormal cocoa-nut found in that colony:—

At Assam Java, Kwala Selangor, there is a plantation of cocoa-nuts which contains two trees of great peculiarity. Instead of the bunches of flowers, which appear on the ordinary cocoa-nut tree, are found shoots which jut out from the tree not unlike the spike of a nipa palm. As the so-called spike grows, the cocoa-nuts themselves, without any show of flower whatsoever, appear in line along the whole length of the shoot somewhat like the fruit on a bunch of 'rambai,' but quite close together. As the nuts swell, the number, which at first might amount to fifty on one shoot, is gradually lessened as they fall off before maturity. In the end there probably remain some seven or eight nuts only on each shoot, of which there may be apparently about the same number as an ordinary cocoa-nut tree has branches of flowers. The natives here have never heard of any similar trees except these two and they call them 'nyor-nipa.'

FRUIT AND NUTS AS FOOD.

Indian Planting and Gardening of November 21 gives an account of experiments conducted by the United States Department of Agriculture to determine the dietary value of different foods. The experiments in question were conducted during the space of two years by Prof. Jaffa, of the University of California. The following extract is of interest as indicating the food value of nuts and fruit, and more especially of pea nuts, or ground nuts as they are usually called in the West Indies:—

The fare given in these experiments was in every case one that would appeal to any normal appetite. It embraced honey, tomatos, apples, bananas, grapes, pears, pomegranates, persimmons, oranges, strawberries, watermelons, figs, almonds, pea nut butter, etc. The only animal foods allowed were cottage cheese and eggs, and these in limited quantities. The cost of such a diet varied from 15c. to 18c. a day. It was found that the food eaten supplied about 60 per cent. of the protein usually secured by the average meat diet, while health and strength continued the same, if they did not improve, and in two or three cases there was a slight gain in flesh and weight.

One of the chief objects of the series of experiments was to furnish data as to the value of nuts as food. Fruits contain little protein, and nuts are relied on in the fruitarian plan of eating to balance the ration. Fruits are rich in carbohydrates and nuts in fat. A pound of pea nuts, which costs 7c., furnishes 1,000 calories of energy at a cost of 3½c., and protein at a cost of 36c. per ℔.

The average price per ℔. of the protein of nuts ranges higher than the corresponding average of meats, but the cost per ℔. of pea nut protein is lower than for meats, fish, eggs, milk, dairy products, and prepared cereals. The only foods which furnish protein at a less cost than pea nuts are flour and dried beans. According to Professor Jaffa's experiments, nuts are the cheapest source of energy for the fruitarian, the pea nut ranging far ahead of any other kind.

Although pea nuts supply protein and energy for a smaller sum than bread, they are outranked by dried beans, which at 5c. per ℔. will supply for 10c. over 200 grains of protein and 3,040 calories of energy.

NUMBER OF PLANTS TO THE ACRE.

The following table, showing the number of plants to the acre when planted at various distances, and the area, in square feet, available for each plant, is reproduced from *Tropical Agriculture* for convenience of reference:—

Feet apart.	Square feet to each plant.	Number of plants to the acre.	Feet apart.	Square feet to each plant.	Number of plants to the acre.
1 x 1	1	43,560	7 x 7	49	889
2 x 1	2	21,780	7 x 8	56	778
2 x 2	4	10,190	8 x 8	64	681
2 x 3	6	7,260	9 x 9	81	538
3 x 3	9	4,840	10 x 10	100	435
3 x 4	12	3,630	12 x 12	144	302
4 x 4	16	2,722	15 x 15	225	193
4 x 5	20	2,178	16 x 16	256	170
5 x 5	25	1,742	17 x 17	289	151
5 x 6	30	1,452	18 x 18	324	134
6 x 6	36	1,210	20 x 20	400	109
6 x 7	42	1,037	25 x 25	625	69

COTTON.

Improvement by Seed Selection.

We published in the *Agricultural News* (Vol. II, p. 373) an extract from a report by Mr. George P. Foaden on a visit to the cotton-growing States of America. Mr. Foaden, who is the Principal of the School of Agriculture in Egypt, paid his visit to the United States in May 1903. His report is published in the *Journal of the Khedivial Agricultural Society and School of Agriculture* (Vol. V, Nos. 4 and 5). The following extracts from the report deal with the important subject of seed selection:—

It is impossible to overestimate the importance of the selection of good seed or the influence which it has on the resulting cotton crop. In the absence of some system of selection, all cultivated plants tend towards deterioration though this is much more marked in some cases than in others. The more highly developed and specialized a plant is, the more rapidly will it deteriorate under adverse conditions. Of all plants, cotton responds liberally, both as far as yield and quality are concerned, to careful treatment, and the sowing of good seed is the very first essential to the production of good stapled cotton. However carefully our land may be prepared and manured, the production of superior cotton from inferior and mixed seed is an impossibility.

The present variety of cotton known as Sea Island has in fact been obtained by one means, and that is 'selection.' While this has been the case, and while the fibre to-day is acknowledged to have attained the highest standard of excellence, yet it is accepted that its superiority can only be maintained provided a system of selection is continued. There is no question of allowing Sea Island cotton to deteriorate; those interested in its growth by the careful system adopted prevent this.

In the selection of seed for cotton we have two primary objects in view, viz., to obtain the greatest yield and the best quality. To select for both objects at the same time is quite possible, though we think that the main object in view can be accomplished by growing in the first place the very best seed obtainable, and then selecting seed from the heaviest yielding plants, provided the quality of those plants is equal to the best standard of that variety. In the system of selection adopted by Sea Island planters most distinctive results have been obtained. For example, one grower's ideal has been to obtain heavy yields with but a secondary regard for quality and this has been quite successful, the grower's cotton being known in the market as that from heavy yielding plants but whose quality is not 'extra.' Another planter again has selected for quality only, and though yield has been to a certain extent sacrificed, yet his cotton is sold for a much higher price. Thus, starting with the same seed, two different ideals may be reached according to the wish of the particular grower. As a rule, however, our primary object is to increase the yield, and while striving to obtain this we have to see that we do not sacrifice quality and other desirable characteristics, but keep them at least up to the best standard.

The history of Sea Island cotton which is so extremely interesting provides us with an object-lesson and ample food for reflection. It serves as an example showing how a tropical plant has not only been adapted to another climate, but at the same time the produce has been brought to a very high pitch of perfection; the whole having been accomplished by selection, aided by good cultivation and manuring. In the year 1785, seeds were brought from the Bahamas and planted in the State of Georgia. The plants died down, but sprang up again from the roots and succeeded in ripening a few seeds before the next winter. The earliest of the seeds thus produced were sown and this again repeated the following year. By this means an earlier flowering and ripening plant was produced until at last the plant matured a large proportion of its seed before adverse climatic conditions came, and this even along the coasts of the Carolinas. Having attained this, a very careful system of selection was adopted with the view of improving quality, that is to say increasing the length, strength and fineness of the staple. By a continuation of this process of vigorous selection, the production of the finest quality cotton in the world has been attained.

Selection of Seed.

To a representative of the Barbados *Advocate*, who visited the Barbados Central Cotton Factory on January 29, Mr. W. B. Seabrook, Ginnery Expert to the Imperial Department of Agriculture for the West Indies, made the following remarks on this subject:—

The first important step in planting cotton, with any hope of success, is to secure *good seed*—seed that can be guaranteed to yield fibre uniform in length and fineness of staple. It is as reasonable to place a cur in competition with a fine-bred setter and hope to get a prize, as to place cotton of mixed quality and staple in the market and expect it to obtain the same price as that which is uniform.

The *good seed*, to which I refer, and which is so essential to success, could be obtained to the best advantage where Sea Island cotton is raised in its highest state of perfection, viz., from the Sea Islands of South Carolina, especially those nearest to Charleston. The selection of cotton seed has long been a study with planters there, and good seed, yielding fibre of good length and fineness of staple, can be obtained from them as proposed by the Imperial Department of Agriculture. Thousands of bushels of Sea Island cotton seed are used every year for fertilizing purposes—planters refusing to plant it because of deterioration in quality. This might be obtained for very little; but if unfit for planting there, it would be unfit here. It is necessary, therefore, to obtain seed from a reliable source, and one where its purity can be vouched for. The difference in cost will be a small item in comparison with the difference in result. Once the strain is established in the West Indies, enterprising and intelligent planters could at once begin to make selections for themselves, and keep up a continuous supply of fine, long-staple cotton to be delivered to the Central Factories which are fully able to prepare it for the market in the best possible condition.

The Cotton Worm in British Honduras.

A correspondent writing in the *Clarion* states that some of the newly planted cotton in British Honduras has been attacked by the cotton worm. It appears that an attempt was made to grow cotton in that colony at the time when high prices were obtained for cotton during the American civil war, but was abandoned on account of the ravages of this pest. Now, however, that it is realized that the cotton worm can be kept in check by the use of Paris green, its presence need not prove a very serious obstacle.

Evidently the cotton worm is general. It appears in every country where cotton is grown; so that there is nothing exceptional in its appearance in the West Indies.

PREVENTION OF MALARIA.

The Barbados *Official Gazette* of February 11 contains a circular despatch from the Secretary of State for the Colonies giving information in connexion with the investigation of malaria and the training of medical officers in the treatment and prevention of tropical diseases. In this despatch an outline is given of what has been attempted in the direction of improving health and sanitation in tropical colonies and protectorates, and of the work of the Malaria Commission appointed by the Royal Society on the suggestion of the Secretary of State for the Colonies. As enclosures to the despatch are published a statement by the Secretary of the Royal Society, briefly reviewing what has been accomplished by the Commission, and a memorandum by Drs. Stephens and Christophers setting forth their views as to the results of their researches on native malaria and the prevention of malaria. From the latter enclosure we extract the following notes on ' personal precautions ' :—

We cannot emphasize finally too strongly the need at present for these. We ourselves, by unremitting care, completely escaped contracting malaria during over three years' residence in Africa and India ; in places, too, where, more frequently than not, the deadly conditions we have described existed. Among these precautions we place the proper use of a mosquito net as far and away the greatest means of individual protection.

1. *Mosquito net :* The net should be square (not a bell net), should not have a single, even minute, hole, should hang inside the poles if these are used, should be tucked in *under* the mattress, and should *not* trail on the ground. A piece of closely woven material, fastened on all round at the level of the body is a necessary addition, in order to protect the limbs during sleep from bites *through* the net. When not in use the ends of the net should be twisted up somewhat, and then thrown over the top. We always arranged our nets ourselves, never trusting to servants, and further to be doubly certain, we always carefully searched the interior with a candle before going to sleep. To these minute precautions, solely, we attribute our absolute freedom from malaria. Employed without care and attention, a mosquito net is little protection in such malarious places as most up-country African stations.

2. *Subsidiary measures:* In many of the more malarious places we visited we considered that other subsidiary precautions, such as will suggest themselves to any intelligent person, were also necessary. To protect our legs and ankles, for instance, we considered it necessary to wear thick trousers, with puttees, or the very convenient, so-called mosquito boots. The face and hands are not in waking hours very likely to be bitten by *Anopheles*, though they are very likely to be bitten by various species of *Culex*. It must be understood, however, that for precautions to be effective in badly malarious places considerable care and thoughtfulness is entailed, and few followed our example.

3. *Quinine :* During the whole of our three years' life in the tropics we found it quite unnecessary to use quinine. If, however, the bites of *Anopheles* cannot be guarded against, quinine should be taken as a prophylactic. We consider Professor Koch's method of taking 15 grains on two successive days in each week as the best. Repeated small doses are of doubtful efficacy.

In view of the above recommendations interest attaches to the following letter, from the Booth Steamship Co. to the Honorary Secretary of the Liverpool School of Tropical Medicine, published in the *Journal of Commerce* of January 22 :—

The following extract from the log of the captain of our steamer 'Javary,' while lying at Iquitos, Peru, about two months ago, will no doubt be of interest to all connected with the Liverpool School of Tropical Medicine :—' There appears to be quite an epidemic in Iquitos this voyage, and several deaths have taken place from "Black Vomit." Fortunately, the ship's company keep healthy. The mosquito nets supplied by the company are a great boon to the men, for the mosquitos just now are almost unbearable.' We may mention that, following the recommendations of the Liverpool School, our steamers trading to Iquitos have been for several years regularly provided with mosquito nets for the use of the crew, with the most satisfactory results. Cases of malaria were frequent, sometimes resulting fatally, but since the introduction of the mosquito nets and their general adoption by all members of the crews, we are pleased to say that these steamers have enjoyed a wonderful immunity from sickness. In view of this we have latterly provided mosquito nets for the crews of all our steamers in the Para and Manaos trade, and although it is rather soon to make any definite statement as to the result, we have reason to suppose that it will be equally satisfactory, as it is some months since we heard of the last case of yellow fever, and so far as we know, not one has occurred in any steamer after the introduction of the mosquito nets. We place these facts before you as they will no doubt be of interest to other shipowners trading with the tropics.

ARBOR DAY AT MONTSERRAT.

The following letter from Mr. Charles M. Martin, Inspector of Schools for the Leeward Islands, to the Imperial Commissioner of Agriculture, dated Montserrat, February 3, 1904, gives an account of the Arbor Day celebrations in that island :—

You will be glad to hear that our Arbor Day celebrations in Montserrat were a great success.

On Monday, January 25, fifteen trees were planted at Harris' Cemetery to form an avenue along the main walk. On Tuesday, the two schools met before the Court House (the children wearing the distinctive colours of their school gardens) and, after a short address by me, marched to Cocoanut Hill, where nearly forty mahogany trees were planted on both sides of the road. Mrs. Watkins was present and planted the first tree. On Wednesday, the children of Olveston school planted six trees as the first beginning of what should be a fine avenue along the approaches to the school. On Friday, Bethel school planted eight trees along the boundaries of the school premises. In all, some seventy trees were planted and over 1,100 children took part in the proceedings. The amount of interest evinced by both teachers and children in the celebrations was gratifying.

In future, Arbor Day will be held on the King's Birthday. Special songs and recitations have been learnt and were rendered on the occasions referred to above, and it is evident that the day will be one of lasting good to all concerned. I must acknowledge with thanks the services of Mr. Jordan, which helped greatly to the success of the proceedings. Mr. Watkins, who took great interest in the arrangements, was unfortunately prevented by illness from being present on any of the days, and we much regretted his absence.

PRINCIPLES OF NUTRITION.

The following brief account of the general composition of foods and feeding stuffs is taken from a recently issued Bulletin of the United States Department of Agriculture (Office of Experiment Stations, Bulletin No. 125) entitled: *A digest of Recent Experiments on Horse Feeding.* The concise explanations of the principal terms used in connexion with the composition of foods is likely to be useful:—

The study of foods and feeding stuffs has shown that, although they differ so much in texture and appearance, they are in reality made up of a small number of chemical constituents, namely, protein, fat, carbohydrates and ash, together with a larger or smaller amount of water. The latter can often be seen as in the juice of fresh plants. In dry hay no water or juice is visible. A small amount is, however, contained in minute particles in the plant tissues.

Protein is a name given to the total group of nitrogenous materials present. The group is made up mainly of the true proteids and albumens, such as the gluten of wheat, and of nitrogenous materials such as amides, which are believed to have a lower feeding value than the albumens.

The group 'fat' includes the true vegetable fats and oils, like the oil in cotton seed or corn, as well as vegetable wax, some chlorophyll (the green colouring matter in leaves, etc.) and other colouring matters; in brief, all the materials which are extracted by ether in the usual laboratory method of estimating fat. The name 'ether extract' is often and very properly applied to this group. Chemically considered, the true fats are glycerides of the fatty acids, chiefly oleic, stearic and palmitic.

The group 'carbohydrates' includes starches, sugars, crude fibre, cellulose, pentosans, and other bodies of a similar chemical structure. This group is usually sub-divided, according to the analytical methods followed in estimating it, into 'nitrogen-free extract' and 'crude fibre'; the former subdivision including principally sugar, starches and most of the pentosans, and the latter, cellulose, lignin, and other woody substances which very largely make up the rigid structure of plants. The proteids contain nitrogen in addition to carbon, oxygen, hydrogen, and a little phosphorus and sulphur. The fat consists of carbon, oxygen and hydrogen, as do also carbohydrates. In the carbohydrates, however, the oxygen and hydrogen, are always present in the proportion in which they occur in water, namely, two atoms of hydrogen to one of oxygen.

The group 'mineral matter' includes the inorganic bodies present in the form of salts in the juices and tissues of the different feeding stuffs, the principal chemical elements found being sodium, potassium, calcium, chlorine, fluorine, phosphorus and sulphur. The term 'ash' is often and very properly used for this group, since the mineral matter represents the incombustible portion which remains when any given feeding stuff is burned.

The relation between the quantities of nitrogenous and nitrogen-free nutrients in the ration is called the nutritive or nutrient ratio. In calculating this ratio 1 lb. of fat is taken as equivalent to 2·25 lb. of carbohydrates—this being approximately the ratio of their fuel values—so that the nutritive ratio is actually that of the protein to the carbohydrates plus 2·25 times the fat.

SUGAR-CANE EXPERIMENT STATIONS IN JAVA.

The following interesting account of the sugar-cane experiment stations in Java, and the lines upon which investigations are being carried on, by Dr. J. D. Kobus, is translated from the *Revue Agricole* of Reunion for October 1903:—

The West Java station was started at Kagok in 1886. For three years it was located in the town of Pekalongan. The East Java station dates from 1887. It has been located from the beginning in the town of Pasoeroean.

Formerly there was a third station—Central Java—founded in 1885. The able director, M. F. Soltwedel, died in December 1889 after having discovered the possibility of raising sugar-canes from seed. With him also originated the idea of growing sugar-canes in mountain lands at an elevation of 2,000 feet so as to avoid the ravages of the sereh disease. After two or three years the station was closed.

At West Java the first director was W. Krueger, the well-known author of the German treatise on *Sugar-cane and its Culture*, in which he has recorded his personal experience in Java (from 1886 to 1891), as well as that of the other stations in the island up to 1896. In 1891, he was succeeded by Dr. F. A. F. C. Went, who has gained great distinction by his researches on the diseases of the sugar-cane. He was assisted by H. C. Prinsen Geerligs who succeeded him in 1896. The researches of Prinsen Geerligs on sugar manufacture are widely known, also his little work which has already passed through three editions in Dutch and in English.

The first director of the East Java station was Dr. J. G. Kramers. I assisted him as sub-director. In the first few years we were engaged in soil research experiments with various manures, etc. In 1890, the director was succeeded by Dr. J. H. Wakker, a botanist of distinction. He set himself to concentrate our efforts on researches as to the cause of the disease known as 'sereh,' which threatened entirely to exterminate the sugar-cane in Java. Dr. Wakker made interesting and thorough research in regard to other diseases of the sugar-cane, but, like Dr. Went, he did not succeed in discovering the cause of 'sereh'.

After ten year's of active work, Dr. Wakker resigned his post for personal reasons. I succeeded him in 1898. Since 1893, I had been editing the *Archief voor de Java-Suikerindustrie*, a work which I had to relinquish on assuming the directorship of the station. As you know the chemical selection of the sugar-cane and the raising of seedlings have since occupied the better part of my time. I still, however, continue my researches on the soil and my experiments with manures. . . .

All the publications of our stations are sent to the contributing members of each station. All without distinction can ask for information from each other and all have equal rights to the varieties of sugar-cane and seeds, provided that applications are received before July 1. We raise the canes ordered on their account and in January the seedlings are sent to them and the cost received. Last January more than 17 acres of cane were grown by us for raising seedlings. As soon as the young canes are six months old, each internode can be used as a plant. In January 1904, our nurseries will be on a still larger scale. Our experiment fields at the same station have an area of 86 acres, containing more than 200 varieties of seedling canes. The best only are distributed to the Usines; before this it is necessary that they should have been carefully proved for four consecutive years.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 79 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, FEBRUARY 27, 1904. No. 49.

NOTES AND COMMENTS.

Fibre of Agave americana.

Mention was made in the *Agricultural News* (Vol. III, p. 24) of an account given in the *Imperial Institute Bulletin* of fibre of a plant forwarded from Assam under the name of *Agave americana*. The following note appears in the current issue of the same journal:— 'The Imperial Institute has now been informed by the Officiating Reporter on Economic Products to the Government of India that the identity of the plant in question is under investigation and that it is probably not *Agave americana*, as was originally supposed.'

Cotton Cultivation.

With the view of presenting the details of cotton cultivation in a popular and attractive form, the Imperial Department of Agriculture is arranging for a series of addresses, illustrated by latern slides, to be delivered before the beginning of the next planting season.

The addresses will afford hints and suggestions as to the selection and preparation of the land and the best time for planting. They will give full particulars of the methods to be adopted for sowing the seed, thinning out seedlings, weeding and moulding the plants and the treatment of the worm and other pests; also as to picking, assorting and grading the cotton ready to be sent to the ginning factory.

It is probable that the addresses will be delivered simultaneously in each island in April, May and June next.

Toronto Exhibition, 1904.

In the *Agricultural News*, Vol. II, p. 325, the attention of readers was directed to a report by Mr. G. Whitfield Smith, Travelling Superintendent of the Imperial Department of Agriculture, who happened to be present, on the West Indian section at the Exhibition held at Toronto in August and September last. It will be seen from this report that not only were the larger colonies well represented, but excellent exhibits were also forwarded from the Windward and Leeward Islands and from Barbados. The West Indian section generally was greatly appreciated and excited a good deal of interest among visitors at this Exhibition.

With the view of again bringing the staple products of these colonies prominently under the notice of the Canadians, and of developing closer business relations between them and our fellow-subjects in the Dominion, it is desirable that each colony should be fully and attractively represented at the Exhibitions to be held in Toronto and elsewhere in Canada in August and September next. It is therefore important that steps be taken to obtain glass bottles for exhibits at once so that they may be ready in time for use when required in July next.

Cotton Planting at Montserrat.

A discussion has taken place in the columns of the Montserrat *Herald* relative to the best time for planting cotton.

A correspondent suggests that this should be done either earlier or later than has been the practice hitherto, in order to avoid having cotton in a forward state during the months of September, October and November. During these months insect pests are particularly abundant and the cotton worm has proved no exception. It is therefore contended that cotton should be planted either in March or, for late planting, in October and November. The early planted cotton, being then ready for reaping about August or September, when the caterpillar is abundant, would be in a condition in which it would be least likely to be harmed. On the other hand, the cotton planted during October and November would ripen from March to May before the insects are particularly abundant.

The experience of this correspondent is to some extent confirmed by that of Mr. Jordan, the Agricultural Instructor, who gives figures to prove that the best results were obtained when the cotton was planted early. Mr. Jordan points out, however, that other factors have to be taken into consideration in determining the best time for planting cotton, and that this must be influenced largely by local conditions.

This is an important matter and we would urge upon planters to endeavour to work it out by carefully tested experiments. At the same time it should be remembered that, if a good supply of Paris green be kept at hand and the plants dusted immediately they are attacked by the caterpillar, no serious loss need be anticipated.

Sugar-cane Experiments in British Guiana.

We publish in this issue of the *Agricultural News* (pp. 66-7) the first instalment of a progress report on the sugar-cane experiments in British Guiana for the half-year ended December 31, 1903.

In this report Professor Harrison reviews the work that has been carried out during the half-year. An account is given of the efforts to raise seedling canes. An idea of the extent of this work will be obtained when it is realized that some 2,500 seedlings were obtained, and that this is the lowest rate for many years. Owing to the exceptional dryness of the weather during September and October, a large proportion of the arrows were abortive and there was a scarcity of fertile seeds. The experiment in the cross-fertilization of the White Transparent and the Mani canes, which was not successful, is to be repeated.

As will be seen from the tables, the manurial experiments bring out clearly the fact that the amount of available nitrogen added in manures is the principal factor regulating the yield.

Utilization of Para Rubber Seeds.

An interesting article on this subject will be found in the current issue of the *Imperial Institute Bulletin* (No. 4). As mentioned in the *Agricultural News* (Vol. II, p. 296), the Technical Branch of the Imperial Institute has been investigating the properties of the seeds of the Para rubber tree (*Hevea brasiliensis*). Several consignments of seeds and of meal prepared from them have recently been received at the Imperial Institute for a report as to their commercial values.

Oil was obtained from the kernels, which constitute about 50 per cent. by weight of the whole seed, and from the whole seed; the former yielding 42·3 per cent. of oil, and the latter 20 per cent. The oil obtained from the kernels alone is clear, of a light colour, and has an odour somewhat resembling that of linseed oil. Leading brokers, to whom the oil was submitted, reported that it would probably be used as a substitute for linseed oil and would be worth at present £20 per ton. They valued the decorticated seeds at £10 to £12 per ton.

The sample of Para rubber seed meal was free from husk and possessed the pleasant odour characteristic of oil meals. The following results were furnished by the meal on analysis :—Moisture, 9·1 per cent.; ash, 3·53; fibre, 3·4; oil, 36·1; proteids 18·2; carbohydrates, 29·67.

'The results of this examination of the Para rubber seed meal indicate that the material thus prepared could neither be used as a fodder, owing to the presence in it of large quantities of free fatty acids, nor for the expression of Para rubber seed oil, since the latter has been largely decomposed. It is probable, however, that if the oil were expressed from the decorticated seeds, the residual cake could be utilized as a feeding material. Such a "cake" should be almost as valuable as linseed cake, which at present sells at from £5 15*s.* to £6 15*s.* per ton.'

Cotton Growing in British Guiana.

The Demerara *Chronicle* of February 10 reviews the first half-yearly report of the Berbice Cotton Growers' Committee.

While those whom the movement is essentially intended to benefit have not responded in as hearty a manner as might have been expected, and in consequence only a few competitors entered for the prizes offered by the Committee, yet the promoters are to be congratulated upon the start that has been made. The prizes for the best cotton cultivation in each of the ten districts of Berbice, into which the Committee divided the county, are to be offered again for the current half-year, when it is anticipated that there will be 'keener competition and more promising results.' It is reported that 460 lb. of cotton seed had been distributed during the previous three weeks, and that about 98 acres of land is expected to be planted in cotton on the West Coast, Berbice, and 50 acres on the Upper Berbice river.

His Excellency the Governor has offered a prize of $50 for the largest area in cotton before June next, and Sir H. A. Bovell a prize of $60 for the best 200-lb. bale of cotton. A prize is also being offered by Mr. Bruce Stephens, of Trinidad, to encourage the new industry.

Hybridization.

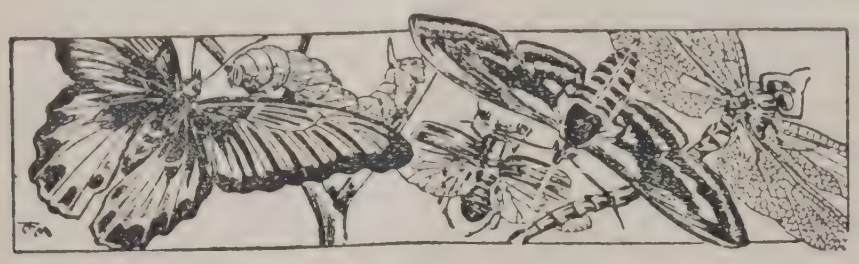
A paper on this subject was read by Mr. D. J. Wilson at the opening of the West of Scotland Agricultural College in October 1902.

It is pointed out that work on hybridization has probably been carried on for ages. The first hybrid plant of which we have any record was the result of the crossing of two species of *Dianthus* by Thomas Fairchild.

Most of the earlier work on hybrids was done by gardeners rather than by agriculturists; this is to be explained by the facts that gardeners have a larger variety of plants to work on and that their knowledge of the individual plants is likely to be greater.

The International Conference on Plant Breeding held in New York in 1902 showed how great an interest is now being taken in this subject, especially in the United States.

The author himself has worked on an elaborate series of crosses in the genus *Brassica*. Among others, hybrids showing intermediate characters have been obtained using Brussels sprouts, as the seed parent, and curled kale, broccoli and savoy, as pollen parents. Some of the hybrids, although they flower profusely, do not bear seed; this is owing to the fact that the pollen is inferior. Crossing of Irish potatos is a difficult matter owing to the fact that some varieties never bear flowers, while very few bear fruits freely. A number of hybrids have, however, been obtained, some of which have yielded promising results. One result is curious: when the tubers of one parent are red and those of the other white, it is found that many of the tubers of the cross are purple and white, but few are red.



INSECT NOTES.

Fumigation of Imported Plants.

The necessity for the adoption of a careful and systematic scheme to prevent the introduction of insect pests into agricultural centres has been forcibly demonstrated in recent years, and inspection and fumigation at ports of entry have been shown to be more effective than any other method yet devised.

Of the insect pests that have become so serious as to threaten even the existence of several horticultural or agricultural enterprises, by far the greater number have been those introduced from elsewhere, which have found more favourable conditions in the new localities than in the places from which they came. Striking examples might be given of such introductions, but a few of the more notable ones will suffice.

The grape Phylloxera (*Phylloxera vastatrix*) which, in its native home in the United States was very insignificant as a pest, became, when introduced into the vine-growing districts of Southern France, a most serious scourge, causing loss aggregating millions of dollars and threatening the very existence of the vine industry. The Colorado potato beetle (*Doryphora decemlineata*), when first discovered, was merely of scientific interest feeding upon wild plants, but with the great increase in the area cultivated in the Irish potato (*Solanum tuberosum*) it has spread over the entire North American continent and has become a pest of vital importance. The Cottony Cushion Scale (*Icerya purchasi*) as a native was of minor importance in Australia, but when introduced into the citrus groves of California, it nearly ruined the orange and lemon industries. The histories of this pest in New Zealand and Cape of Good Hope, of the Gypsy Moth (*Porthetria dispar*) in Massachusetts, and the San José Scale (*Aspidiotus perniciosus*) in the United States all illustrate the serious danger that may arise from imported pests.

With a view to preventing any such serious trouble many governments have passed laws to prohibit the importation of plants, cuttings, bulbs and other articles likely to be infested with serious pests, or the treatment of such imported articles at ports of entry in order to disinfect them. Among the countries having such laws may be mentioned New Zealand, Cape of Good Hope, Germany, France, Switzerland, Turkey and Canada. In the United States many states have laws requiring the regular inspection, once a year, of orchards and nurseries, and, if found free of noxious insect or other pests, a certificate to that effect is given the proprietor. Many states also insist that all nursery stock shipped into the state shall be accompanied with such a certificate of inspection.

In the West Indies also something has been done along this line. Jamaica has laws in operation requiring the fumigation with hydrocyanic gas of all imported plants. The fumigation as required by these laws has been carried on for several years with marked success. The British Guiana Court of Policy has recently passed a law entitled 'An Ordinance to prevent the introduction into this Colony of Diseases of Plants.' The planters in Dominica have asked for similar enactment to protect the lime and orange industries in that island, and already fumigating chambers are in course of construction and it will probably not be long now before suitable laws are enacted to provide for the fumigation of all imported plants.

The general method adopted for disinfecting nursery stock and other plants is known as the hydrocyanic gas method, and when fumigation is mentioned in this connexion, it always means that treatment, unless otherwise specified.

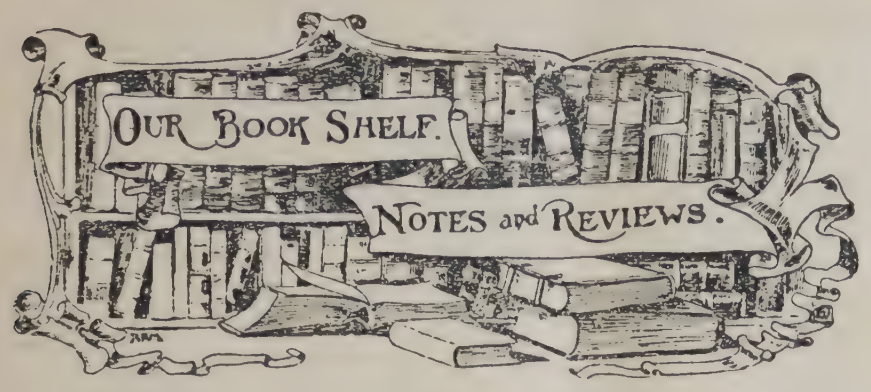
Hydrocyanic gas as an insecticide was first used in combating the Cottony Cushion Scale in California, by Mr. D. W. Coquillet in 1886. Since that time many experiments have been tried with it and its great value as an insecticide is now firmly established. It has been used for fumigating nurseries, orchards, granaries, mills, houses, ships, etc., as well as plants, fruits and vegetables for import or export shipment.

As applied to the British West Indies fumigation of imported plants cannot fail to be of the utmost benefit. It is true that many insect pests and especially scale insects are already to be found in these islands, but as pointed out by Mr. Maxwell-Lefroy in his paper in the *West Indian Bulletin* (Vol. III, p. 240) entitled 'Scale Insects of the West Indies,' about one-third of all the species of scale insects now known in these islands are introduced species. Thus, 80 species are given as native, 4 as doubtful in origin, and 36 introduced. Of the introduced species it is necessary to mention only two, the Purple or Mussel Scale (*Mytilaspis citricola*) and the Orange Snow Scale (*Chionaspis citri*). These perhaps are the most serious pests of orange and lime trees in these colonies. On the other hand, the native West Indian Red Scale (*Aspidiotus articulatus*), found everywhere throughout the West Indies and on a great variety of plants, rarely becomes a serious pest. These instances might be multiplied, but they should suffice to convince any who may have hitherto doubted the value of preventive measures in dealing with insect pests. The fact that we are already troubled with pests of many kinds cannot for a moment be given as a reason why we should allow others to be admitted, and especially when it is remembered that imported or introduced pests are likely, and almost certain, to become more destructive than the native ones. Hence the necessity of adopting an efficient means of preventing the introduction of such pests will be apparent. The old saying 'an ounce of prevention is worth a pound of cure' may very truly be applied to the matter of insect pests. That fumigation with hydrocyanic gas furnishes the necessary prevention has been amply proved by workers in economic entomology in many countries and under varying circumstances.

Carbon bisulphide for Parasol Ants.

The Trinidad *Bulletin of Miscellaneous Information* for January contains an interesting reference to the value of carbon bisulphide as a destroyer of the parasol ant in Trinidad. Mr. Hart states: 'it has been tried here in every possible way on the "Bachrack" or parasol ant and has been found very effective. It has also been recently used as an insecticide for herbarium specimens and books and found to be very effective.'

A Cheap Paint. According to *American Gardening* of January 30, 'a cheap and durable outdoor paint is made by mixing hydraulic cement, to the consistency that can be applied by a brush, with sweet skim milk. A quart of the cement requires about a gallon of milk.'



THE CYPRUS JOURNAL: Published at the 'Cyprus Journal' Office, Nicosia. Price 2*cp.* per number; annual subscription including postage abroad, 3*s.*

This is a new publication, the purpose of which is described by the sub-title—'a monthly review of the agriculture, industries and archaeology of Cyprus.' It is proposed to publish in English and Greek, and in some instances in Turkish, information likely to be useful to the farmers of Cyprus.

This issue contains a review of the efforts that have been made by the Government to bring about an improvement in the agricultural condition of the island. Nursery and Experiment Gardens have been started as a means of distributing economic plants, and land has been purchased for a Model Experimental Farm.

Among other interesting articles may be mentioned: 'Cotton cultivation in Cyprus,' 'the Advantages of Agricultural Exhibitions and Shows,' and 'the Requirements of Productive Trees.'

'THE FOOD OF THE GODS': By Brandon Head. *London: R. Brimley Johnson, 4, Adam Street, Adelphi, W. C., 1903.*

This book gives a fairly complete, popular account of the growth and manufacture of cacao. It deals with the subject mainly from a commercial point of view and is naturally of very little special interest to the cacao planter.

The book is nicely got up and contains a large number of well-executed illustrations relating to the cultivation of this crop in the West Indies.

The first chapter deals with the nature of cacao, its uses, adulterations, constituents, etc. In the second chapter an account is given of the growth and cultivation of the cacao tree and the curing of the beans. The last chapter, dealing with 'sources and varieties' is also of interest.

LIQUID FOOD FOR HOUSE PLANTS.

The following note, taken from *American Gardening* of January 30, should be of value to amateur gardeners and others interested in growing pot plants in the West Indies:—

The best liquid food for house plants and the most economical is made from sheep manure. To prepare this make a bag of coarse material, and in it put a quart of sheep manure. Put the bag in a wooden pail, fill up with cold water and let it stand for a day. Pour off the water and use one quart to the gallon in the watering-can: apply only to the roots, giving each plant a good dose. Fill the pail again with water, and the next week use this half and half. Take out the bag and let it drip to give another dose, using this half and half, then spread the dregs as a mulch on the soil of the pots. For house pots do not water the soil again until the pot on the outside shows the need of it. The harm done in watering house plants is in washing the nutriment out of the soil.

STREET TREE PLANTING.

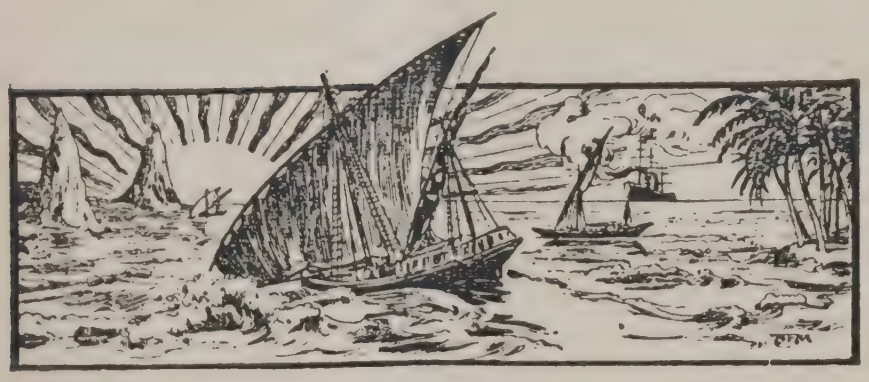
Indian Planting and Gardening of January 2 has an article on the above subject emphasizing the need for the appointment of a special officer whose duty it would be to supervise the planting of trees in the streets of Calcutta. It is pointed out that not only are trees planted in a haphazard fashion without regard to their suitability for the purpose, but moreover, the employés of the Telephone and Telegraph Companies are allowed to lop and hack the trees in such a way as to spoil their appearance.

This is a point to which attention might also be paid in the West Indies; we have seen many instances of damage being done in this way. It is not only that the trees are made unsightly by this treatment, but the lopping being carried on without any regard for the most elementary rules of pruning, the result is disastrous to the health of the trees. Rough stumps and jagged wounds are left which soon give rise to rotting and disease: the rotting spreads, and a fine tree is finally destroyed. If such work were done under the supervision of a capable gardener, the trees would not be rendered unsightly nor would they be permanently damaged as a result of fungoid attacks.

The writer of the article referred to goes on to quote from a review in the *Gardeners' Chronicle* of a recent French work on street planting as follows:—

The methods of transplanting, the machinery employed, the care to be given after removal, the cost, and other particulars are briefly and clearly described. We notice, however, that M. Liquet, like every one else, adopts the plan of putting a grating (*grille*) close up to the base of the tree for the admission of air and water to the roots; but that is just the place where such an arrangemeut is least required. The grating should be fixed at some considerable distance from the trunk, so as to admit air and water to the feeding roots. These, as every one knows, are at a distance from the trunk. A similar mistake is often made in applying manure close round the base of the tree instead of at a distance. Two or three large gratings at intervals between each tree and its neighbour would be better than the present system; better still would it be to have, wherever possible, an open border all the way along from tree to tree. Now that street-planting on an extensive scale will soon be carried out in the new streets in the course of construction in London, these details should be attended to.

Vitality of Seeds. A remarkable instance of the extraordinary vitality of henbane seeds has perhaps sufficient importance to be placed on record. About four years ago a considerable portion of the foundations of the ancient Priory, near Belvoir Castle, Leicestershire, was laid bare in the cause of antiquarian research, and the soil and other débris thrown out on the adjacent old pasture land. The following year some remarkably fine plants of *Hyoscyamus niger* grew, flowered and ripened their seed amid thistles and nettles. Several plants appeared the year after, but since that time they have, apparently, become extinct. Now, as this Priory is said to have been demolished in the reign of Henry VIII, a much longer period has elasped than in either of the instances mentioned above. Although *Conium maculatum* abounds in the neighbourhood, I have never seen *Hyoscyamus niger* growing wild within a radius of 20 miles from Belvoir Castle. (*Pharmaceutical Journal.*)



GLEANINGS.

Good West Indian kola nuts sold recently for 5½*d.* per ℔.

At a meeting of the Liverpool Chamber of Commerce, the Chairman (Sir Alfred Jones, K.C.M.G.) stated that the exports of West African cacao in 1893 were £9,000, and in 1902, £94,000 in value.

The following report and valuation on a small sample of cotton sent from Hannay's plantation, Barbados, has been recently received:— 'Bright, clear, good, silky staple. Value per ℔. on spot, 13*d.* to 13½*d.*'

It is announced that the Trinidad Agricultural Society has made suitable arrangements for the permanent exhibition of commercial samples of the products of Trinidad in the Board of Trade Building, Montreal.

The Superintendent of the Botanic Station, British Honduras, gave two lectures with practical demonstrations to elementary school teachers on Tuesday and Wednesday, January 5 and 6, at the Botanic Station. (The *Clarion*, January 14, 1904.)

We learn from the St. Vincent *Government Gazette* of January 21 that it is proposed to charter a vessel to ply between St. Vincent and Grenada every Friday, arriving at Grenada in time for Saturday morning's market. It is hoped that in this way a market will be found for St. Vincent fruit and vegetables.

According to *Indian Planting and Gardening* of January 9, careful experiments have been conducted in the Government Laboratory at Muktesar, which show that quinine is absolutely useless in cases of rinderpest. Inoculation treatment for this disease is, on the other hand, growing in popularity.

The total value of the produce shipped from Tobago to Port-of-Spain during the year 1902-3 is given as nearly £30,000. The shipments include 1,086 cattle, 1,823 goats, 2,203 pigs, 3,260 dozen of eggs, 2,030 dozen of fowls, 16,600 gallons of cocoa-nut oil, 2,000 bags of cacao, 226 tons of sugar, and over 500 tons of vegetables. (*Our Western Empire*, January 15, 1904.)

In view of the spread of the cotton mite at Montserrat, the Imperial Department of Agriculture is advising the planters that at the close of the present season all the old cotton plants should be destroyed (if possible by fire) and not a single one left to carry over the disease to the next season. Also that, as far as possible, the planting for the next season be established on fresh land and with selected seed obtained outside the island and carefully disinfected beforehand.

It is announced that arrangements have been made through the Trinidad Agricultural Society for the importation of Gros Michel banana suckers in regular shipments by each Royal Mail steamer. These will be supplied in retail lots at cost price subject to a commission of 5 per cent. It is estimated that the cost landed on wharf will be 15s. per hundred.

The *Pharmaceutical Journal* of January 30, 1904, states: 'A Congo plant, known as Iboga, has been examined by Làndrin and Dybowsky. It is stated to possess properties similar to those of coca and kola. It is a woody plant of low growth, with a large root. The natives use all parts of the plant, but prefer the root, as being more active. Its physiological properties are due to an alkaloid named ibogaine.'

The *Farmer and Stock-breeder* of February 1 contains notes by the Veterinarian of the Oklahoma Experiment Station on the treatment of mange in cattle. A cheap and effective remedy can be prepared from tobacco and sulphur as follows: 'Place 1 ℔. of tobacco leaves or plug in 1 gallon of water and allow to stand for twenty-four hours; boil and allow to stand over night. Mix 1 ℔. of sulphur in a gallon of water; remove tobacco leaves from the infusion, and mix this with the sulphur water, adding 4 gallons of water.'

A Colonial Products Exhibition was opened at Liverpool on December 29 by the Duke of Marlborough. The exhibition owes its initiation to Sir Alfred Jones, K.C.M.G. Among the stalls, which attracted a considerable share of attention, may be mentioned Mr. Thomas Dowd's West Indian Exhibit, containing a fine selection of Jamaica fruits, and the display of banana products ('Bananine' bread and flour) by Mr. Wm. Alfred Jones, of the Jamaica Produce Company.

The Jamaica *Times* of February 6 announces the following results in connexion with the recent teachers' agricultural course:—

'Mr. Cousins gave £2 and Mr. Fawcett £1, as prizes for the best forked patch of land. Mr. G. A. Robinson, Mr. L. Virtue and Mr. Hay gained 97 marks out of a maximum of 100. They got £1 each. A further prize of £1 was given by Mr. Cousins for the best essay on the course. Mr. Jabez Stewart won this.'

According to the *Textile Mercury* of January 23, notice has been received by the Cuban Vice-Consul in London 'that the province of Santa Clara will be able to export, in four months' time, an important amount of Sea Island cotton, which is the best quality, and a smaller amount of the Upland, which is not so good.'

This is interesting as showing that Upland cotton is not so satisfactory in Cuba as Sea Island, thus confirming the experience in the British West Indies.

An interesting paper on a familiar subject, the relation of temperature to the keeping property of milk, has reached us from Storrs, Connecticut. The view of the writer, Dr. H. W. Conn, the well-known dairy bacteriologist, is that the keeping of milk is more a matter of temperature than of cleanliness. At 50° neither of the lactic ferments makes much growth, but putrefactive bacteria develop, and though these may not make the milk sour, they make it unwholesome. Milk, which has been kept sweet by exposure to low temperatures, should be viewed with suspicion. (*Nature*, January 29, 1904.)

LECTURES ON THE DISEASES OF THE SUGAR-CANE: By L. Lewton-Brain, B.A., F.L.S., Mycologist on the staff of the Imperial Department of Agriculture. Pamphlet series, No. 29.

As announced on p. 25 of this volume, the lectures on the diseases of the sugar-cane, recently delivered at Barbados by Mr. Lewton-Brain, have been issued in pamphlet form. We quote from the preface the following remarks of the Imperial Commissioner of Agriculture :—

'The diseases referred to attack canes to a greater or less extent in all the sugar-producing colonies in the West Indies. The root disease (*Marasmius*) was especially prevalent at Barbados last year, and it was largely due to the attacks of this fungus that the sugar crop of 1893 (35,000 hhds.) was lower than any during a period of thirty-four years. It was even lower than in 1895, when the ravages of the rind fungus (*Trichosphaeria*) reduced the normal crop of 56,000 hhds. to 36,000 hhds. and led to the practical abandonment of the Bourbon cane. The principal canes now cultivated are the White Transparent and seedling canes.

'A conservative estimate, after making every allowance for unfavourable seasons and other circumstances, has placed the loss due to the attacks of fungoid diseases at Barbados during 1903 at 10,000 hhds. of the value of £70,000. If we take into account the loss sustained in molasses also, the total loss in 1903 would not fall far short of £100,000. It was with the view of aiding the planter to control the diseases affecting his crops, especially in these days of low prices, that the lectures delivered by Mr. Lewton-Brain were organized. If the advice given in the lectures be closely followed, there is little doubt that the loss likely to be sustained from the attacks of cane diseases might be reduced at least one-half. It is hoped that in view of these facts the recommendations of the Department will receive the hearty support of all members of the planting community.

'The root fungus is present again this year, but, owing to the greater vigour of the canes due to favourable seasons, the effects are not so marked as last year. It is recommended that tops for planting should be selected from healthy canes only ; that where the disease shows itself in small patches in the fields these should be isolated by a trench (about a foot deep) dug round them, so as to prevent the disease from passing through the soil and attacking healthy canes ; that all cane stumps whatsoever should be dug up and destroyed either by burning or being heaped up and treated with quicklime ; and that where a field has been very badly attacked by root disease it should be thrown out of cultivation in canes, treated with lime, and planted with other crops for a period of at least one year, preferably two years.

'These recommendations are of so simple and practical a character that no difficulty need be experienced in carrying them out, and especially as the probability is that they would be the means of saving a considerable portion of the loss to the sugar industry of this island which was estimated last year by responsible officers of the Department at £100,000.'

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left for the Northern Islands in the S.S. 'Orinoco' on February 22. An important conference of landowners and planters was to be held at St. Lucia on the 23rd. instant to discuss the prospects of cotton growing in that island. Agricultural Shows were to be held at Dominica on February 25, at Montserrat on February 25, and Antigua, on February 26. Afterwards the Imperial Commissioner proposed to proceed on a visit of inspection to St. Kitt's and Nevis, and return to Barbados in the S.S. 'Dahome' on March 4.

Subject to the approval of the Secretary of State, Mr. R. D. Anstead, B.A., Christ's College, Cambridge, will assume the duties of Agricultural Assistant at the Government Laboratory under the Island Professor of Chemistry, in connexion with Sugar-cane Experiments at Barbados, from March 1 next.

Pending the approval of the Secretary of State, Mr. W. N. Sands, Curator of the Botanic Station at Antigua, will proceed to take up the duties of his appointment as Agricultural Superintendent at St. Vincent on or about March 5 next.

GOAT KEEPING.

The following notes on goat keeping appear in the *Journal of the British Honduras Society of Agriculture and Commerce* (Vol. I, Part 2, p. 32):—

It is perhaps not generally known that thousands of kid gloves are made every year from goat-skins. Many millions of pairs of gloves of all shades and thickness are the product of the destructive goat.

In the raising of goats we have another profitable industry which might advantageously be taken up by some persons in this colony. We are apt to look upon goats as a nuisance. So they undoubtedly are in the towns and wherever there is a garden or cultivation of any plants ; but there are thousands of acres of scrubby country land which could be utilized for raising large herds of these animals. Take our pine ridges, which are to some extent useless for cultivation : goats would thrive well on such lands. They do not require very much care, as is the case with most other animals, and they are easily managed. A few boys can look after several hundred.

In addition to this skin-value, the flesh, especially when young, is excellent meat and can be sold. Goats also furnish a very rich milk that can be made into cheese, etc.

An ordinary sized goat-skin is worth from 25c. to 50c.

There should be a large margin of profit in this business, as goats require no expensive feeding, in fact they can forage out all the food they need for themselves.

Rubber from Corn Oil. According to the *India Rubber World*, rubber from corn oil is a most important rubber substitute, its popularity being due to its usefulness as a filler and insulator and to its low cost. Corn oil rubber is one of the products of the Corn Products Co. of the United States. The plants operated by this company also manufacture glucose, starch, dextrine, syrup, glycerine, etc., the rubber being one of the by-products.

MARKET REPORTS.

London,—February 2, 1904. Messrs. Kearton, Piper & Co., Messrs. E. A. De Pass & Co. and Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', January 29, 1904; and 'The Public Ledger,' January 30, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/3 to 1/8 per lb.
Balata—1/9 to 2/2 per lb.
Bees'-wax—£7 5*s.* per cwt.
Cacao—Trinidad, 68/- to 74/- per cwt.; Grenada, 53/- to 62/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 61/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/2 per lb.
Coffee—Jamaica, ordinary, 40/- to 58/- per cwt.
Copra—Trinidad, £16 15*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/4 to 1/5 per lb.
Divi Divi—No quotations.
Fruit—
  Bananas—Jamaica, 5/- to 7/- per bunch.
  Grape Fruit—10/- to 11/- per case.
  Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
  Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 35/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/4 to 2/11; Cake, 1/5 to 1/6 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 9*d.* to 1*s.* per gallon; Concentrated, £12 10*s.* to £13 per cask of 108 gallons.
Lime Oil—No quotations.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/9 to 2/3 per lb.
Nitrate of Soda—Agricultural, £9 15*s.* per ton.
Nutmegs—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per lb.
Pimento—4*d.* to 4¼*d.* per lb.
Rum—Demerara, 9*d.* to 10½*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—No quotations.
Sugar—Crystallized, 14/9 to 16/- per cwt.; Muscovado, 12/- to 14/-.
Sulphate of Ammonia—£12 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—January 12, 1904.—'The Maritime Merchant.'

Molasses—Barbados, 34c. per gallon. Porto Rico, 40c.

New York,—January 22, 1904.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12c.; Caracas, 13c. to 14½c.; Jamaica, 10½c. to 12½c.; Grenada, 12½c. to 12¾c.; Trinidad, 13¼c. to 14½c. per lb.
Cocoa-nuts—Trinidads, $17·00 to $18·00; Jamaicas, $21·00 to $23·00 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7½c. to 8¾c. per lb.; Manchester grades, 10c. to 12c. per lb.
Ginger—Jamaica, 7¼c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Grape Fruit—$3·50 to $5·60 per barrel.
Oranges—$3·50 to $4·00 per barrel.
Pimento—7½c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3 11/32c.; Muscovados, 89°, 2 27/32c.; Molasses, 89°, 2 19/32c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—February 13, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$10·00 to $10·50 per 100 lb.
Cocoa-nuts—$9·37 per M. for unhusked nuts.
Coffee—Jamaica and ordinary Rio, $10·00 and $12·00 per 100 lb. respectively.
Hay—$1·00 per 100 lb.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—16c. per gallon (puncheon included).
Onions—$3·25 to $3·42 per 100 lb.
Potatos, English—$2·46 per 100 lb.
Rice—Ballam, $5·25 per bag (190 lb.); Patna, $3·60 per 100 lb.
Sugar—in hhds., $1·25 to $1·30 per 100 lb. (packages included).

British Guiana,—February 11, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·50 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 11c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 13c. to 14c. per lb. (retail).
  —Creole, 13c. per lb.
Dhal—$3·70 to $3·80 per bag of 168 lb.
Eddoes—$1·80 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, (casks included).
Onions—4c. to 5c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
Plantains—24c. to 72c. per bunch.
Potatos, English—$3·00 to $3·25 per barrel.
Rice—Ballam, $4·60 per 177 lb., ex store; Creole, 18c. to 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·44 per barrel.
Tannias—$2·16 per bag.
Yams—White, $1·44 per bag.
Sugar—Dark Crystals, $1·75; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—February 11, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary, $12·50 to $12·75; Estates, $13·75 per fanega (110 lb.).
Cocoa-nuts—$16·00 per M., f.o.b., selected in bags of 100, (husked).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—55c. per Imperial Gallon (casks included).
Coffee—Venezuelan, $8·00 to $8·35 per 100 lb.
Copra—$2·40 to $2·60 per 100 lb.
Onions—$2·70 per 100 lb.
Potatos, English—$1·40 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $5·25 to $5·75 per bag.
Sugar—No quotations.

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Pamphlet No. 29,—

'LECTURES ON DISEASES OF THE SUGAR-CANE.'

'WEST INDIAN BULLETIN' (Vol. IV, No. 4).

Containing report of Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the cotton-growing districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 50. BARBADOS, MARCH 12, 1904. PRICE 1*d*.

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Cotton Industry.

IN spite of many adverse circumstances the cotton crop now being reaped, though small in quantity, is proving of excellent quality everywhere in the West Indies. In this connexion it may be interesting to mention that the Secretary of the British Cotton Growing Association reports that a consignment of cotton just received from Barbados 'is valued at from 16*d*. to 17*d*. per lb. and is considered the best Sea Island cotton which has yet been imported from the West Indies.'

The cotton ginneries at Barbados, Montserrat, Antigua and Nevis are in full working and it is expected that regular shipments of cotton, on a commercial scale, will take place during the next few weeks. The yield, as already stated, is not so large so was anticipated, owing to the unfavourable season and the attacks of the cotton worm. It is felt, however, that with the experience now gained the cotton worm and other difficulties should be successfully dealt with during the coming season.

The question of low freight for cotton is occupying a good deal of attention. It is probable that the present rates (65*s*. per ton weight) will have to be reduced, as there are indications that through shipment via New York to Liverpool or Manchester may be possible at about 45*s*. per ton weight.

The great point in establishing the cotton industry is to obtain careful and intelligent action in cultivating the crop of 1905 and ensure that the utmost effort is made to obtain not only cotton of good quality but in such quantity as to make the industry remunerative. The experience so far gained should prove of great service in this direction. The heavy rains and strong winds, experienced during the past season, cannot be provided against; but as regards better cultivation and the treatment of the cotton worm there should be great improvement in all directions.

The first important matter to arrange for is the destruction of all old cotton plants at the end of the present crop so as to leave nothing for insects and other pests to feed upon to carry them over until the next crop. There should be no attempt to ratoon any areas in cotton this year. Those who do so will only have themselves to thank, if their plants are affected with disease and the crop is injured. Nothing can justify any attempt at carrying over a ratoon crop this year. It is hoped that no one will attempt anything of the kind. The risk is too great, and, besides, the yield of a ratoon crop from the present plants is likely to be so small as to be hardly worth the trouble.

The next point is carefully to select new land for the next planting. The soil should be good and deep, of a light loamy character and in a sheltered and accessible situation. The land should be ploughed or forked and well broken up so as to form a mould. The locality should not be a wet one. A rainfall exceeding 80 inches per annum may be regarded as probably too heavy for profitable cotton growing.

The selection of good seed has been urged so often that it is hardly necessary to repeat recommendations under this head. None of the seed grown this year in the West Indies should be used for planting purposes. The Imperial Department of Agriculture is prepared to supply the best seed direct from the Sea Islands at cost price. Further, this seed will be disinfected beforehand.

Perhaps the most important point of all is to prepare for the attacks of the cotton worm. This attacks cotton everywhere. It is proved, however, that the treatment with Paris green and lime is absolutely trustworthy, if applied in time. For every acre planted in cotton there should be kept at hand, ready for use for the cotton worm, at a moment's notice, at least 3 lb. of Paris green and 18 lb. of slaked lime; also bags of coarse osnaburg for distributing the mixture consisting of one part of Paris green to six parts of lime. Those who are prepared to carry out fully these suggestions and give close attention to the cultivation and care of their cotton fields need have little or no anxiety as to the future of the cotton industry in these colonies.

Blindness Caused by Sand-box Juice. It is generally known throughout the West Indies that the juices ('milk') of the sand-box, the manchineel and other trees are of an injurious nature. As a case in point, mention might be made of a man in Trinidad who has been blind for about four years, the blindness having been caused, it is said, by the juice of the sand-box tree (*Hura crepitans*).

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

The following concludes the progress report, the first instalment of which was published in the previous number of the *Agricultural News*:—

Half of the older plots on North field received dressings of slag-phosphates in June 1901, applied at the rate of 6 cwt. per acre. The means of the yields of the varieties of canes grown upon it without and with slag-phosphates, when reaped in 1902 as plant canes, were 68·6 and 68 tons respectively.

The following shows the tons of canes per acre reaped from each variety in December 1903 as classed under their various systems of nitrogenous manuring:—

1st. ratoons.

Nos. of canes.	No Nitrogen.		Low Nitrogen.		High Nitrogen.	
	No phos-phates.	Slag-phos-phates.	No phos-phates.	Slag-phos-phates.	No phos-phates.	Slag-phos-phates.
625	42·8	42·9	47·7	48·2	51·6	51·8
116	35·1	31·2	38·9	39·2	43·8	48·3
130	28·4	28·1	32·3	31·2		
95	18·7	19·7	25·3	26·6		
145	34·9	29·9	42·1	46·9	38·7	42
109	28·7	31·9	35·1	34·7	42	42·5
78	28·4	28·5	36·3	34·8	40·7	41·9
115	28·3	31·2	36·6	41·8		
74	24·0	25·7	35·3	33·7		
3,956	32·7	32·5	30·4	31	37·6	42·2
Mean	30·2	30·2	36	36·8	42·4	44·8

Sixty plots on this field were occupied by four varieties, one-third of the plots receiving in 1902, at the planting of canes, slag-phosphates at the rate of 6 cwt. per acre, one-third 'basic superphosphate' at a similar rate, while the remaining third did not receive any phosphatic dressing. The results in tons of canes per acre were as follows:—

PLANT CANES.

Nos. of canes.	No Nitrogen.			Low Nitrogen.			High Nitrogen.		
	No phos-phates.	Basic.	Slag.	No phos-phates.	Basic.	Slag.	No phos-phates.	Basic.	Slag.
2,190	21·7	21·1	26·2	31	18	15	33·7	35·3	32·2
B. 147	30·3	30·3	29·4	25·5	34·5	39·1	35	34	36·3
White Trans-parent	28·9	31·7	29·9	32·8	36·9	42·9	36·9	37	37·3
Bour-bon	29·5	24·5	28	29·2	31·4	26	29·5	31·7	32·2
Mean	27·6	26·9	28·4	29·6	30·2	30·2	33·8	34·5	34·5

On South field, using ninety-two plots with varieties as plant canes, the comparative results with and without slag-phosphates were as follows:—

PLANT CANES.

Nos. of canes.	No Nitrogen.		Low Nitrogen.		High Nitrogen.	
	No phos-phates.	Slag-phos-phates.	No phos-phates.	Slag-phos-phates.	No phos-phates.	Slag-phos-phates.
625	20·2	20·2	21·9	25·4	29·4	31
115	17·1	17·1	25·7	25·8	28·7	28·6
109	17·8	19·9	27	26·5	29·8	31·4
W. Transpt.	16	15·1	23·8	23·5	24·5	24·6
Mean	17·8	18·1	24·6	25·3	28·1	28·9

Taken in connexion with the figures, yielded by the analyses of the soil made in 1891-2 and in 1902 and contained in the reports for 1896-1902 and for 1902-3, the results indicate that if a British Guiana sugar-cane soil shows on analysis a content of ·008 per cent. of phosphoric acid soluble in 1 per cent. citric acid solution or of ·002 per cent. soluble in two-hundredth normal hydrochloric acid under conditions of constant shaking for five hours, manuring with phosphates in all probability will not produce appreciably increased yields of sugar-cane.

This conclusion based on the results of twelve years' field-experiments is an important one for the guidance of planters in this colony. At present large quantities of slag-phosphates (1,655 tons valued at $21,849 at port of shipment in 1902-3) are yearly imported, at an approximate cost on the field of say $20·00 per ton, and are applied to the soil at the rates of several hundredweights per acre. By submitting a properly drawn sample of the soil to which he contemplates applying slag-phosphates for analysis (at a cost of $2·50) the planter can ascertain whether his soil contains more or less than ·008 per cent. of phosphoric acid soluble in 1 per cent. citric acid, and be guided accordingly. In my opinion considerable economy would ensue from the adoption of this course.

The following, arranged in order of their yields of indicated saccharose, shows the rates of yields of canes per acre and the saccharose-contents of the expressed juices of the varieties of canes which were reaped in December 1903 as third ratoons on the Brickdam field :—

Nos. of canes.	Tons canes per acre.	Saccharose lb. per gallon.	Bourbon equals 100.
1,087	44·7	1·816	217·4
B. 147	45·2	1·728	207·7
145	42·1	1·822	198·3
625	52·6	1·478	194·7
1,896	40·2	1·884	189
109	38·1	1·842	181·3
754	40·6	1·796	176·1
135	36·5	1·832	167·1
1,483	36·3	1·822	160
3,157	36·2	1·770	158·1
1,143	35·2	1·718	157·9
1,640	34·5	1·738	157·5
1,184	32·6	1·863	156·6
115	39	1·671	153·7
3,873	33·6	1·759	151·4
1,905	31·6	1·790	147·7
116	34·9	1·775	147·3
74	28	1·884	147
2,190	33·8	1·796	143·3
125	35·1	1·619	140
2,028	31	1·660	139·2
130	41·3	1·666	139·2
132	32·8	1·536	138·8
2,468	29	1·816	136·4
4,399	36	1·458	133·2
3,287	30·7	1·666	128·7
102	28	1·666	124·3
1,880	24·6	1·863	123·8
3,866	31·7	1·603	123·4
117	25·7	1·822	112·9
White Transpt.	25·4	1·730	111·7
4,139	27·7	1·536	110·1
Bourbon	21·6	1·796	100
1,859	17·1	2·009	77·7

These canes were not supplied and hence the results are indications of the actual ratooning powers of the varieties as compared with the Bourbon.

The mean indicated saccharose in the expressed juice of each of the varieties per acre per crop, which has been cultivated on this field since 1900, is as follows :—

Nos. of variety.	Saccharose in expressed juice per acre of canes.	Nos. of variety.	Saccharose in expressed juice per acre of canes.
B. 147	5·20	1,880	3·96
145	5·11	1,896	3·95
625	4·99	116	3·78
115	4·74	125	3·76
1,087	4·69	130	3·72
109	4·66	135	3·72
74	4·63	754	3·60
2,190	4·10	102	3·37
1,640	4·05	117	3·19
3,157	4·05	White T.	3·15
132	4·01	1,483	3·06
2,468	4·00	1,905	3·01
2,028	3·98	Bourbon	3·00

The high yield of B. 147 in these experiments is worthy of note. As in the earlier Barbados experiments under similar conditions of plot growth, it has appeared to be a cane of exceptional high potential value, while, as it is reported to have been in Barbados, in this colony on a large scale it has been a comparative failure.

Six hundred and twenty-five mule-cart loads of canes were distributed during the last fortnight of December to the various plantations and to a very few cane farmers who applied for them. I am of opinion that we now know sufficient about our new varieties of canes to be able to recommend some of them with confidence to cane farmers, and I hope in the near future to receive applications from them.

WEST INDIAN FRUIT.

VARIETIES OF BANANAS AT TRINIDAD.

We take the following note on varieties of bananas from the Trinidad *Bulletin of Miscellaneous Information* for January last:—

The new varieties of bananas at St. Clair, which were introduced from the East Indies by the Imperial Department of Agriculture, have commenced to fruit. The first bunch is mature and turns out to be something quite different to any hitherto grown in the colony. It came to us under the name of *Musa discolor*.

CARRIAGE OF FRUIT.

One of the difficulties in the way of establishing successful fruit industries in the West Indies is that of getting the fruit to the port of shipment. In some districts the absence of good roads increases this difficulty, and renders it almost impossible to avoid injury to the fruit. But even when roads are good damage is often done by carelessness in carting. The state of affairs, described in the following extract from the *Queensland Agricultural Journal*, is only too common in these islands:—

A short time ago, while riding along a country road through one of our best orange-growing districts, I met a cartload of oranges on the way to the nearest railway station. Every case that I could see was standing *on end* in the cart, and had come its journey in that position.

Now, fancy fruit being jolted along a bush road on end, and then shipped off to some distant market! What chance has that fruit of presenting a sound and attractive condition and appearance under the salesman's hammer? Is it not almost certain to be so seriously damaged as to lose a big percentage of its value? No other result is possible; and yet growers complain from time to time of their fruit going wrong when they send it away, and that in some way that *they can never understand.*

They declare that it was perfectly sound when gathered and packed; that nothing whatever was the matter with it. Well, all I can say is that there is likely to be a good deal the matter with it after going 8 or 10 miles over bush roads with the cases on end. One of the great points in packing and handling fruit for market is the avoidance of pressure, and all jarring or bumping, as far as is possible. But here you have the greatest possible pressure, and the finest chance in the world for the maximum of jarring and friction.

And supposing that the fruit was packed in the most careful manner to begin with, that careful packing is likely to be very seriously disturbed before the end of such a journey.

I want to say to our growers that this sort of thing will not do. It will neither bring credit or profit to those engaged in the industry. Care at *every* point must be the motto, or some single act of carelessness will probably spoil a lot of good work and a lot of good fruit at the same time.

PEASANTRY AND CULTIVATION.

The Demerara *Argosy* of January 6, in reviewing the report of the Department of Lands and Mines for 1902-3, makes the following reference to cultivation by peasant proprietors:—

The Commissioner regrets that the cane-farming industry is not in a more flourishing condition, but when we remember that the price of sugar has been abnormally low, we need not consider the fact that 2,500 acres have been devoted to the staple by farmers altogether unsatisfactory. It may safely be predicted that when a better price rules for sugar those peasant proprietors, whose farms are in the vicinity of sugar estates, will not be slow to take advantage of the inducements to put part of their land, at all events, in canes. Cane cultivation they are acquainted with and will take to, if they find a profitable market for their produce. At present, the farmers grow, for the most part, perishable products, it being estimated that 75 per cent. of their total cultivation consists of plantains, tannias, cassava, etc., and the Commissioner remarks that the supply of these already exceeds the demand. Except in the Pomeroon and the North-West District, the small holders do little more than grow sufficient vegetables for the support of their families. 'While all are ignorant of the method of cultivation of crops of a more permanent nature,' Mr. Fowler states, 'the majority lack stimulus to increased industrial activity, their wants being of the fewest and simplest, and readily supplied by the bounty of nature with a minimum of toil. It is this lack of stimulus that is responsible more than anything else for the backward state of our minor industries. In Barbados every plot of ground possible of cultivation is beneficially occupied, because in the struggle for existence, rendered necessary by a dense population, the people realize the need of making the most of their opportunities. Here as much land as can be profitably occupied may be purchased at 15c. per acre, free of any conditions as to cultivation, so that our rural peasantry hardly require to exert themselves at all to supply their few and simple wants. It would be a good thing for Barbados, and a good thing for this colony, if a few thousands of that island's agricultural labourers could be induced to come over and settle on our Crown lands.'

COTTON.

Cotton at St. Vincent.

The following notice, signed by Mr. W. B. Seabrook, Cotton Expert, and Mr. C. H. Knowles, Acting Curator of the Botanic Station, has been inserted in the St. Vincent papers :—

Cotton planters are asked to facilitate the work of the Cotton Factory and also to further their own interests by giving careful attention to the following points when picking and preparing the cotton for ginning at the Factory :—

(1) *No short-staple cotton* of any kind should on any account be mixed with the long-staple Sea Island.

(2) Great care should be taken to remove *all trash, bits of leaves, etc.*, from the cotton when picking and before it is mixed in bulk.

(3) Yellow stained cotton can be ginned, but must be sent separately and not mixed with clean white cotton.

Cotton Bales.

We extract the following note on this subject from Mr. Foaden's report to which we referred in the last issue of the *Agricultural News* (Vol. III, p. 69):—

The American cotton bale leaves a great deal to be desired, and the question is one which has been discussed at great length during recent years. Compared with an Egyptian bale, it is very inferior : it shows the cotton in many places, the bagging is inferior and the ties often break. The standard size of the American bale is about 54 inches long, 27 inches wide and about 16 inches thick, weighing about 500 lb. The Indian bale is smaller and lighter, the Egyptian, though not much larger, is heavier. The average weight of the bale of the chief cotton-growing countries is approximately as follows :—

American, 500 lb. ; Brazilian, 230 lb. ; Egyptian, 740 lb ; Indian, 400 lb. ; and Peruvian, 182 lb.

The Supply of Cotton.

The following note, taken from the January number of the *Journal of the Jamaica Agricultural Society*, gives a hopeful account of the prospects of the cotton industry in the future, which should do much to remove any doubts of growers as to the ultimate success of the efforts now being made to revive the cultivation of cotton in these islands :—

There never was a period in the history of cotton when the prospects of a great world shortage is so evident as now, a shortage, too, not like the one caused by the Civil War in the United States. Formerly it was almost wholly the county of Lancashire in England that consumed cotton. Now it still takes as much as ever—or would if it could get it. It is not through want of trade but lack of supply that the mills there have shut down, and Belgium, Germany, Italy, Japan, India and the United States have all large cotton-manufacturing industries besides. The United States does not supply itself with just the varieties of cotton that we can grow best, viz., Sea Island and Egyptian. It imports from Egypt annually 7½ million dollars worth of cotton. Was there ever an industry with such a good chance—when the world gasps for supplies and cannot get them ? Will the demand last ? It is calculated that it will, for the United States are using more and more of their Upland cotton, while it is not probable that they will ever be able to grow all the Sea Island they require. A shortage for many years yet is in sight.

DIVERSIFICATION OF CROPS IN THE WEST INDIES.

The following is a letter addressed by the Imperial Commissioner of Agriculture to the Editor of the *Louisiana Planter* on the above subject :—

In the *Louisiana Planter*, No. 26, for December 26, I notice it is stated that although during late years I have been advocating a diversification of crops in the British West Indies, I am now said to have slightly changed my views.

As the *Louisiana Planter* is so widely read in these colonies, as well as in other parts of the world, I would ask your permission to place on record that the views I have consistently advocated for twenty-five years have in no degree altered in regard to the necessity for a diversification of crops as a means of improving the circumstances of the West Indies.

In my address at the Sugar Conference, held at Jamaica on November 11 last, I drew special attention to the sugar industry and advocated its extension, because in the eager rush for profits arising from the cultivation of bananas there were indications that the claims of sugar, as one of the staple industries of the island, were in danger of being overlooked. I went on to say that a prosperous sugar industry would also mean a prosperous pen-keeping industry. The sugar industry and cacao and other industries were essential in order to place the circumstances of the island in a stable condition, so that, if anything happened to one industry, the others should be able to take its place. It was not safe to depend alone on a flourishing banana industry. It was necessary that a flourishing sugar industry and flourishing cacao, coffee and other industries should also be maintained in the island.

At the present moment, in order to aid still further in the diversification of crops, I am taking an active part in encouraging a cotton industry and in starting on a moderately large scale the cultivation of rubber trees, onions, ground nuts, vanilla, oranges, grape fruit and pine-apples.

I would take advantage of this opportunity of thanking you very heartily for the sympathy and the interest shown by the *Louisiana Planter* in the welfare of the British West Indies

In reviewing this letter the Editor of the *Louisiana Planter* writes as follows in his issue for February 13 :—

Elsewhere in this issue will be found an interesting letter from Sir Daniel Morris, the Imperial Commissioner of Agriculture in the British West Indies. The letter explains the present position of Sir Daniel, and we were led into our conclusions, to which he takes exception, by his seeming reference to the sugar industry as the main dependence, after all, of the British West Indies, when the continually falling markets throughout the entire sugar world are seemingly carrying disaster to that industry everywhere.

Sir Daniel Morris has done such excellent work already in urging the diversification of crops in the West Indies, that we can only praise his untiring interest, unflagging energy and supreme devotion to the cause in which he is engaged. In this connexion we may give, as applicable to Sir Daniel's present position, a clipping from a recent issue of the Jamaica *Gleaner*, which really states the whole case :—

'The great point in Sir Daniel's agricultural gospel is the necessity for more industries to supplement those on which the island relies to too great an extent at present. He urged this when he was formerly in the island ; he has urged it on every visit he has paid to it since ; he again urges it more emphatically than ever.'

MINOR INDUSTRIES AT BARBADOS.

At a meeting of the Barbados Agricultural Society, held on February 19, after the special business before the meeting had been disposed of, the Imperial Commissioner of Agriculture addressed the members in reference to the present position of minor industries in the island. The following is a brief summary of his remarks :—

Next to the sugar industry, the subjects that were of greatest moment to the island were the experiments that were being carried on in the cultivation of cotton, onions and bananas. These experiments had been going on for some time and were still more or less in the experimental stage. Hence it was of great importance that the planters should consider the circumstances connected with these industries and see what could be done in order to place them on a thoroughly satisfactory footing.

COTTON INDUSTRY.

With regard to the cotton industry, the general impression amongst members of the planting community was that the experiments of the last season had been a good deal interfered with, first of all by the cotton worm, and next by the unfavourable weather that had prevailed during the last three or four months. Nevertheless, the prospects for the present season were promising. He had already received orders for something like 850 bushels of the best cotton seed to be obtained from the Sea Islands, and the invitation to growers to pay for it within a certain time had been well responded to throughout the West Indies. To show that the people were in earnest in the matter in this island, he would mention that Mr. Bovell had received orders and payment for about 4,800 lb. of seed, which meant that at least 800 acres would be put under cultivation during the next season. He had little doubt that, if the planters would exercise due care with their crops, they would have a fair chance of success.

With regard to planting for the next season, he would strongly advise that every effort should be made to prevent the carrying over of diseases to the new crop. With that in view it was necessary that every portion of the last crop should be buried or burned ; that only selected seed, previously sterilized, should be sown; and finally that the cotton should be planted on entirely new land.

If it were found, ultimately, that the conditions of climate and soil were unfavourable to cotton, by all means let them try something else ; but until they had carried on experiments for another year or two, he was of opinion that they would not be in a position to say what the future of the industry was likely to be.

The Hon. Forster Alleyne briefly stated to the meeting his experience and mentioned that although he was a little disappointed in the yield, yet he was not discouraged in the least and was intending to plant as much, if not more, cotton this year.

ONION CULTIVATION.

Sir Daniel Morris then proceeded to make some remarks about onion cultivation. He said that this cultivation had been carried on in some cases with success ; in others it had not been so successful. As far as he could gather, there had been two or three reasons why the cultivation this year had not been so successful as before. One of these was that the season had been an unfavourable one for onion growing. The weather had been very wet, and in some cases the bulbs had commenced to rot. The Department was hoping to obtain seed in July this year. Growers should try to plant their onions this year so as to get them ready for the market about the middle or end of January. At any rate, the experiments were well worth continuing.

Mr. Seibert Evelyn agreed with Sir Daniel Morris that the weather had been most unfavourable for onion cultivation, but considered that, on the whole, the experiments had been satisfactory and should be persevered with. The Hon. Forster Alleyne also expressed himself as satisfied that onions were a most satisfactory crop to grow in Barbados, and stated he intended to continue their cultivation.

SHIPMENTS OF FRUIT.

Sir Daniel Morris said he would next touch on the exportation of fruit. The planters had been trying the experiment of shipping bananas from this island to the English market, packed in crates as in the Canary Islands. On the whole, these experiments had not turned out badly. Some growers had made money, others had lost. If the growers of bananas would grow large bunches and cut them exactly at the right time for shipment, there was little doubt that there was a prospect of a remunerative trade between this island and the United Kingdom by means of the Royal Mail Steamers. He suggested that a conference of the banana growers should be held to consider what might be done to advance their interests.

Sir Daniel Morris then read a letter (dated January 13, 1904), that he had received from the Chairman of the Royal Mail Steam Packet Company. The following is an extract from this letter :—

From my previous communications you are aware that the question of the conveyance of fruit from the West Indies has been having my close personal attention.

CHINESE BANANAS FROM BARBADOS.

I note that your desire is to establish a trade in the Chinese banana from Barbados on entirely different lines from those adopted at Jamaica by the United Fruit Company, of U.S.A., or at Trinidad by the Symington Syndicate, and that in your opinion, a system of ventilation by means of fans is sufficient to enable the Chinese banana, when packed in crates, to arrive in England in good condition.

I also note that cold storage is not required for bananas from Barbados, provided the fruit chamber is thoroughly ventilated by fans sufficiently large to ensure a current of air through the compartment.

ORDINARY BANANAS AND OTHER FRUIT.

The result of my recent investigations has caused me to form an opinion coincident with your own, as to the best system of fitting steamers for the carriage of fruit, and I have now arranged to fit the system recommended by you in the 'Tagus' and 'Trent,' in place of the existing system. The same air will then be continually passed through the chambers and returned to the refrigerators, when, on each occasion, it will be deprived of any moisture. When this work is carried out, and we have had time to ascertain by practical experience if the results are satisfactory, my company will take into consideration fitting a similar system in the other mail steamers.

Eelworms in Tobacco. Mr. John Belling, B.Sc, writes from the Agricultural School at St. Kitt's : 'Some plants of Sumatra tobacco, grown at the Botanic Station, suddenly wilted when about a foot high. In translucent swellings on their young roots I found motionless nematodes or eelworms. The infection was traced to the compost in the boxes in which the seedlings were first pricked out.'

WINDMILLS.

The following information on windmills is taken from King's *Physics of Agriculture* :—

If we except horse-power and that of cattle, there is no form of motor which has been so generally or so widely used on the farm as the windmill, and its use is daily increasing, especially now since all parts are made of steel, well galvanized to protect them from rust, and their relative efficiency has been increased.

WORK TO WHICH THE WINDMILL IS ADAPTED.

It must not be understood that a windmill is well suited to furnish power for any and all kinds of farm work, if only it is made large enough. On the contrary, it is only adapted to certain lines where the work done can be accumulated at times when the wind is favourable, such as pumping water for stock and for the supply of the house, if only a suitably placed reservoir of sufficient capacity is provided ; for grinding grain for stock, and for wood sawing.

WIND PRESSURE.

The pressure which the wind may exert upon a surface depends primarily upon (1) its weight per cubic foot, (2) its velocity, and (3) the angle at which it strikes the surface.

ABILITY OF WIND TO DO WORK.

The work which wind can do depends upon the amount which passes through a given windmill per minute and the pressure which it exerts. But as the pressure varies with the square of the velocity, and the quantity passing the mill varies directly as the velocity, the theoretic working capacity of the wind must increase as the cubes of the wind velocity.

Thus with miles per hour of	5	10	15	20	25	30	35	40
Or, taking 5 to 1, they are as	1	2	3	4	5	6	7	8
The relative horse-powers are as	1	8	27	64	125	216	343	512
Theoretical horse-power is	·025	·2	·675	1·6	3·125	5·4	8·575	12·8

Perry regards it approximately correct to state that a 12-foot windmill in a 5-mile wind may develop $\frac{1}{40}$ of a horse-power, and the figures in the last line in the table above are his.

RELATION OF DIAMETER OF WHEEL TO ITS EFFICIENCY.

In increasing the horse-power of an engine it is not usually necessary to increase its weight and strength much more than in proportion to the increase of power which is to be developed, but in the case of two wind wheels, having the same type of construction, the one which is to develop double the horse-power must have a strength of resistance practically eight times as great in order to withstand the highest wind pressures to which it is liable to be subjected. This is so because doubling the diameter of the wheel not only makes the surface of wind pressure four-fold, but at the same time carries the centre of pressure farther from the axis of the wheel, causing it to act upon a longer lever arm. But to increase the strength of resistance of the wheel eight-fold makes it necessary to build it much heavier and this detracts from its relative efficiency.

Besides this, with wheels of large diameter there are much greater differences in the wind pressure on the different parts of the wind sails, because the actual velocity of the sails increases with the distance of their points from the centre of the wheel. But the angular velocity must be the same in all parts of the sail, and this causes the wind sail to be forced around away from the wind passing through the wheel with very different velocities, and this difference reduces the relative efficiency, so that large windmills of like pattern do not increase the available horse-power as much as the size is increased.

AMOUNT OF WORK DONE BY A WINDMILL IN PUMPING WATER.

We have measured the amount of water which was pumped during one entire year by a 16-foot geared windmill. This mill was provided with three pumps arranged so as to lift water 12·85 feet whenever there was wind enough to enable it to do any work. When the wind was lightest it was given the pump of smallest capacity, when stronger the one of next size, when still stronger both together ; the third pump being used only in the very highest winds.

The smallest amount of water lifted 10 feet high, in ten days, was enough to cover 9·87 acres 1 inch deep, and this occurred from July 28 to August 7, at the time when water for irrigation is most needed. The largest amount pumped was enough to cover 75·73 acres 1 inch deep.

AMOUNT OF WORK DONE BY A WINDMILL IN GRINDING FEED.

Another set of trials, aiming to measure the amount of feed which may be ground with a 12-foot geared windmill, was made at the Wisconsin Experiment Station, and using the observed amounts of corn ground under a wide range of wind velocities and the observed hourly wind velocities, as recorded for the pumping experiment, the amount of feed which could have been ground, had it been fed automatically and kept running continuously, has been computed and given in the table which follows:—

Table showing the amount of corn which could have been ground by a 12-foot aermotor windmill during the year, from March 6, 1897, to March 6, 1898, with all winds from 9 miles to 30 miles per hour.

Wind miles per hour.	No. of hours of wind.	Amount ground per hour.	Total meal ground.	Wind miles per hour.	No. of hours of wind.	Amount ground per hour.	Total meal ground.
		lb.	lb.			lb.	lb.
9	480	20·61	9,891	20	195	515·10	100,400
10	559	38·31	21,410	21	144	592·8	85,360
11	495	61·46	30,430	22	114	675·9	77,050
12	425	90·07	38,280	23	112	764·4	85,610
13	406	124·07	50,400	24	92	858·4	78,970
14	401	164·00	65,770	25	71	957·8	68,010
15	341	208·60	71,130	26	70	1,063·0	74,390
16	328	259·00	84,950	27	57	1,173·0	66,870
17	264	314·90	83,120	28	44	1,289·0	56,710
18	223	376·10	83,880	29	40	1,410·0	56,400
19	193	442·90	85,480	30	33	1,537·0	50,710

The total footing of this table shows that the mill might have ground an average of about 75 bushels of corn per day for the entire year, but this figure would represent the maximum amount of work possible. The minimum could hardly have been less than one-third of this amount.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 79 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, MARCH 12, 1904. No. 50.

NOTES AND COMMENTS.

Title Page and Index.

It is expected that the title page and index of Volume II of the *Agricultural News* will be issued as a supplement to the present issue.

It will be seen that this index is much fuller than that to the first volume, and we have no doubt that readers will derive considerable advantage from this improvement.

Quotations for Cotton.

Recently in the *Agricultural News* (Vol. III, p. 60) attention was drawn to the fact that the quotations given in the public telegrams for cotton in the English market had reference only to Upland cotton whereas the kind now generally cultivated in the West Indies is Sea Island cotton.

The Imperial Commissioner of Agriculture suggested to the Telegraph Company that it would be of greater interest to these colonies, if quotations for Sea Island cotton were substituted for those for Upland cotton. The General Superintendent of the West India and Panama Telegraph Company forwarded the following message, dated March 5 last :—

'Referring to your letter of January 15 last, I beg to inform you that from to-day we shall cease to quote the prices of Upland cotton, substituting therefor quotations for Sea Island cotton as suggested by you.'

It will be understood that in future the prices appearing in the public telegrams relating to cotton will have reference to Sea Island cotton, the sort now generally being grown in these colonies.

Cotton Cultivation.

We would draw special attention to the issue to-day of the *West Indian Bulletin* (Vol. IV, No. 4), containing a full report of the recent visit of the Imperial Commissioner of Agriculture and Mr. J. R. Bovell to the Sea Island cotton districts of the United States of America. This report (containing 88 pages) deals fully and practically with the details of cotton cultivation in the United States and the West Indies and is indispensable to all growers of Sea Island cotton in this part of the world.

The report is obtainable from the London and local Agents of the Department: price 6*d.*; free by post, 8*d.*

Cocoa-nut Disease in British Honduras.

A committee of the British Honduras Society of Agriculture and Commerce was recently appointed to investigate and report on the diseases of cocoa-nut trees. A preliminary report is published in the current issue of the Society's *Journal.*

Until recently, it was believed that a weevil was the sole cause of the destruction of the cocoa-nut palms, but the investigations of the committee seem to show that these insects do not attack healthy trees but only those that have been previously weakened by some other disease.

The committee recommends (1) that the plantations should be kept free from dead trees and branches and from all decaying organic matter, as these encourage injurious insects; (2) that all dead and dying trees should be cut down and burned or buried; (3) that cocoa-nut trees should never be planted nearer than 25 feet.

The Trade of French Guiana.

According to the *Consular Report on the Trade of French Guiana* for 1902, the imports from the British West Indies are increasing, especially from Barbados: this is on account of the continual stream of immigration from that island in search of employment.

The principal export from the colony is gold; the value of this being £599,637 out of a total of £613,755 for the year. The balance represents the value of exports of phosphate rock, essence of rosewood, balata, hides and cacao.

The value of the phosphate rock exported during the year was £6,768; it is obtained from the Grand Connétable Island, and the greater part went to the United States.

It is stated that the small amount of cacao exported (10,537 lb.) would not be worth referring to, were it not for the fact that the soil of the colony is well suited to the cultivation of this product.

Essence of rosewood is produced from *Licaria guianensis.* Formerly the wood was shipped to France, but two factories have recently been erected to extract the essence. The wood is sold in the local market at £3 4*s.* per ton. The average product of 1 ton of wood is 22½ lb. of essence, the price in France of the latter being 10*s.* per lb.

Agricultural Shows.

As will be seen from the brief reports given on p. 91 of this issue, successful Agricultural Shows have been held during the last few weeks at Dominica, Montserrat and Antigua.

A gratifying feature of these shows is the effort that has been made to give an additional interest to the teaching of agriculture in the elementary schools by offering prizes for exhibits of vegetables and plants grown in pots and boxes by children attending these schools.

The local committees who had charge of the arrangements for these shows are to be heartily congratulated upon the success that has attended their efforts, which did not fail to receive the cordial support of planters and peasant proprietors. We feel that these exhibitions are certain to exert a beneficial and stimulating action on the agricultural industries of the islands.

Economical Feeding on Sugar Estates.

In an article on this subject in the *Sugar Planters' Journal* of February 13, a review is given of the progress that has been made in utilizing the by-products of the sugar industry for feeding purposes. It is shown that there is a great increase in the use of molasses as a stock-food ; the favourite method being to give 1 to 1½ gallons per head mixed with grain or chopped hay instead of allowing the stock to feed from troughs direct. In this way the injurious effects, attributed to molasses when fed in excess, are avoided.

The economy of grinding corn is also being more freely recognized, it being known that the meal from cob, grain and stalk forms an easily digestible mixture, while considerably less grain is used.

It is also being found that molasses is useful in giving a pleasant flavour to chopped foods such as pea vine hay, cane tops, corn stalks, etc.

Petroleum from Trinidad.

The last issue of the Bulletin of the Imperial Institute contains an article embodying the results of the examination at the Imperial Institute of samples of petroleum from Trinidad.

Two samples were examined, one from a well sunk at Guayagnayare in 1902, and the other from a natural spring in the neighbourhood of the well. The latter sample is of quite a distinct character from that pumped from the well : it is stated, however, that this variation may be due to the loss by evaporation of the lower-boiling hydrocarbons from the natural reservoir, from which the second sample was drawn. The first sample contained 11·1 per cent. of light petroleum and only 38 per cent. of kerosene (burning oil) and more closely resembles Russian than American petroleum ; while the second contained only 0·2 per cent. of light petroleum and as much as 70 per cent. of kerosene, which, therefore, more nearly resembles Canadian oil.

It is gratifying to learn that both these samples represent valuable commercial products and that ' if the oil-field should on further examination prove to be extensive, this discovery of petroleum will no doubt be of great importance to the colony.'

The Agricultural Condition of Venezuela.

The *Journal of the Society of Arts* for November 13, 1903, has an article on the ' Agricultural and Industrial Condition of Venezuela,' from which we extract the following interesting information :—

The principle crop is coffee, in which, it is estimated, some 420,000 acres are planted, the production being placed at 850,000 bags of 100 lb.

Two grades of cacao are found in Venezuela—the native *criollo* and the *trinitario* cacao, imported from Trinidad. The latter is regarded as inferior in quality, but it grows more rapidly. The average annual crop of cacao is about 8,000 tons.

Tobacco is grown extensively, but Venezuela tobacco has a bitter taste. The sugar-cane is also widely cultivated.

The vast forests, which cover Venezuela, contain all the fine tropical woods. Owing, however, to lack of labour, the exportation of woods is very small.

Cattle breeding has declined considerably in recent years, although Cuba receives 50,000 to 60,000 head of cattle annually. Leather manufacture is the principal native industry, the hides being furnished by the large troups of llames, sheep and goats.

Coffee Trade of Columbia.

A report by Mr. Vice-Consul Spencer S. Dickson, on the state of the coffee trade in Columbia, dated Bagota, September 11, 1903, has recently been published.

Coffee can be grown in almost all parts of the country where the climate is suitable, that is, where the temperature varies from about 59° to 77° F. A tree from four to eight years old will yield, in small and well-cultivated plantations, about 1 lb. annually. The best coffee is almost always exported, the damaged beans being set apart for local consumption.

In the cultivation of coffee, seedlings, raised in nursery beds, are planted at the beginning of the rainy season, the distance apart depending upon the kind of land. The manure most generally employed is the outer skin of the coffee. The favourite shade tree in coffee plantations is the Jack tree (*Artocarpus integrifolia*), although it is stated that it is not used in the interior on account of its being too delicate to stand the long journey. The tree mostly used for this purpose is that known in the West Indies as Pois doux (*Inga laurina*), called in Columbia *Guamo*.

About six years ago Columbian coffee acquired an excellent reputation, and the price went up. This resulted in the over-planting of coffee all over the country. The labour available for carrying on extensive cultivations was found to be insufficient, and many plantations were abandoned, in whole or in part. The revolution of 1899 gave the final blow to the enthusiasm for coffee planting.

The exports of coffee in 1896 were valued at over 13 million dollars, two years later it had dropped to 10 million. The greater part of the produce of the last three years is still stored in the river ports as there are no adequate means of despatching it, since the price of transport has become so exorbitant.

INSECT NOTES.

Lady-birds in the West Indies.

A note appeared in the *Agricultural News*, Vol. II, p. 410, stating that investigations were about to be undertaken by the Entomologist of this Department with a view to obtaining information with reference to the habits and life-histories of the lady-birds in these islands. We make the following extracts from a progress report recently presented to the Imperial Commissioner of Agriculture :—

Specimens have been received from several of the other islands, and some have been collected in Barbados. Most of those forwarded from the other islands have arrived alive and in good condition, but they have not laid eggs after their arrival, though some of them have lived for some time. In all, five species of lady-bird have been under observation.

The red lady-bird (*Cycloneda sanguinea*), the most common of the West Indian lady-birds, is about $\frac{1}{4}$ inch in length, nearly as wide and very convex above. The wing covers are a dark, blood-red colour, the thorax black with white markings at the lateral edges, the head very inconspicuous and brownish in colour. The markings of the thorax give it the appearance of a head with white eyes. This species feeds mostly on the plant lice, only one individual having been seen to feed upon scale insects.

The spotted lady-bird (*Megilla maculata*, var. DeGeer) is more elongate than the preceding, the ground colour is more pinkish or pale-red, and there are twelve black spots on the wing covers. When these are closed together there seem to be only ten spots, because two spots on each side are exactly opposite the two corresponding ones on the other side, and they touch and run together when the wing covers are closed. The head and thorax are blackish with light markings. Length, about $\frac{1}{4}$ inch. This species feeds entirely upon the plant lice so far as is known at present.

Scymuus sp., taken in Barbados, is a very small lady-bird likely to be over-looked and to escape, so small is it and so quick to take flight. It, however, is a valuable species feeding on the white fly (*Aleyrodes*), which is so common on guava trees. Species of this genus are known to occur in several other islands. Length, about $\frac{1}{17}$ inch.

Exochomus nitidulus is a beautiful steel-blue insect with two orange-yellow spots on the thorax, a very little smaller than the red lady-bird, and very useful, feeding upon scale insects. Attempts have been made to establish it in several of the islands, the supply in each case coming from St. Lucia. It is not certain that any of these attempts have been successful. In St. Lucia this species is found most commonly feeding on the Bamboo scale. Length, $\frac{3}{16}$ inch.

There has recently been received from Jamaica another species of lady-bird. This is a small black insect, $\frac{3}{16}$ inch long, very convex above, with six large orange-coloured spots on the wing covers and two on the thorax. Head, yellowish with green eyes. It feeds upon scale insects and will probably prove a very valuable aid in keeping in check scale insect pests.

The following notes on life-history refer to the red lady-bird. In each case only one insect was brought to maturity from the egg clusters.

The following table shows the time spent in each stage :—

No.	Egg.	Larva.	Pupa.	Imago.	Period.
1.	Jan. 8 „ 10	Jan. 10 „ 27	Jan. 27 „ 31	Jan. 31	23 days
2.	„ 6 „ 7	„ 7 „ 22	„ 22 „ 26	„ 26	19 days
3.		„ 6 „ 12	„ 12 „ 18	„ 18	12 days

The life-cycle of No. 1 is complete except that no time is given for the laying of the eggs, which would probably occupy only a few days. As far as observed, twenty-three days are occupied in passing through the changes from egg to perfect insect.

Comparison may, however, be made between Nos. 1 and 2 in the larval stage, where No. 1 spent seventeen days and No. 2, fifteen days. Also we may compare all these in the pupal stage, in which No. 1 spent four days; No. 2, four days, and No. 3, six days.

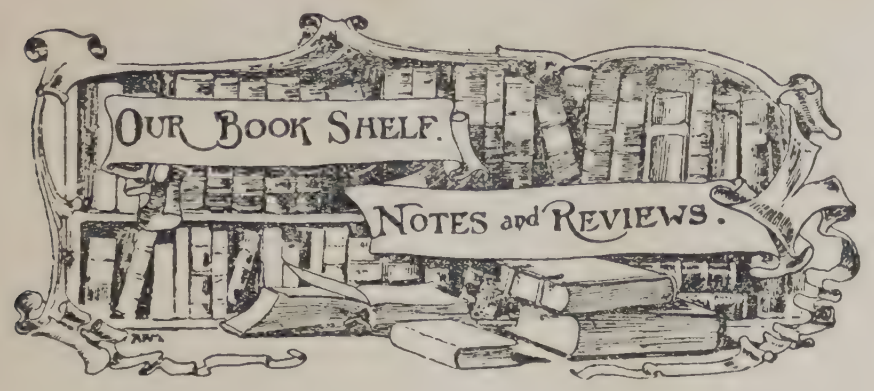
Several of the lady-birds under observation in the laboratory have been observed to feed upon scale insects, others feed greedily upon the plant lice and some feed upon both scales and plant lice. The cotton plant louse (*Aphis gossypii*) has been most frequently fed to them, although one adult fed upon the plant louse on the grape. I may mention that while in Montserrat recently I found individuals of the red lady-bird feeding on the young of the cotton stainer (*Dysdercus andreae*).

Thrips on Cacao in Grenada.

Mention was made in the *Agricultural News* (Vol. III, p. 10) of the increasing severity of the attacks of the cacao thrips and of the necessity for vigorous action on the part of the planters. The following recommendations are made by the Entomologist on the staff of the Imperial Department of Agriculture :—

I would suggest two washes which might give good results and which seem at least worthy of fair trial. The first is Lounsbury's Lime and Sulphur formula used at the Cape of Good Hope. This is made by boiling 10 lb. lime with 20 lb. sulphur in a large kettle, in sufficient water to dissolve them. Good quicklime should be used and any additional water should be added gradually. This is sufficient for from 100 to 300 gallons of wash. I would recommend a trial of this on a very few trees to see whether it would give good results with the thrips and whether it would injure the foliage, fruit, or branches of the cacao.

The second wash that might be worth trial is Lefroy's mixture—whale oil soap, 10 lb.; crude Barbados oil, $5\frac{1}{2}$ pints; naphthalene, 4 oz. This should be dissolved in water at the rate of 1 lb. to 4 gallons water and 1 lb. to 2 gallons water. Care must be taken to get it thoroughly dissolved.



DOMINICA AGRICULTURIST, NO. 2: Edited by H. A. Alford Nicholls, C.M.G., M.D., F.L.S. Price 2*s.* 6*d.*

The second number of this publication, which is the journal of the Dominica Agricultural Society, has just been issued. It contains an account of the proceedings of the society for the year 1901, with full reports of its meetings.

Among the papers that are reproduced may be mentioned that by his Honour H. Hesketh Bell, C.M.G., on the cultivation of pine-apples in Dominica. There is also an interesting account, contributed by various members, of the cultivation of the lime.

It is gratifying to note that the Dominica Agricultural Society is still in a flourishing condition, and we hope it will continue to receive the hearty support of the planting community.

THE NATURAL HISTORY OF PLANTS: By Professor Kerner von Marilaun, English translation by Professor F. W. Oliver. New edition in 16 parts at 1*s.* 6*d.* each. *London: Messrs. Blackie & Son, 50 Old Bailey, E.C.*

We refer our readers to previous notices of the new edition of this valuable work in the *Agricultural News* (Vol. I, pp. 123, 203 and 267, and Vol. II, p. 77). Numbers 7 to 16 have recently been received and these complete the work, which is one that all students of botany will find both useful and interesting.

The first section of the second volume deals with the reproduction of plants and includes interesting chapters on the dispersal of pollen and of seeds and the crossing of flowers; while in the second section the history of species is dealt with including the alteration in the form of plants due to various external conditions and a discussion on the origin of species.

THE EVOLUTION OF PLANT LIFE: LOWER FORMS: By G. Massee, F.L.S. *London: Methuen & Co., 18 Bury Street, W.C., 1891.* Price 2*s.* 6*d.*

This volume is one of Messrs. Methuen's 'University Extension Series' which are intended for the use of extension students and home reading circles, to supplement the teaching of the lecturer. The author, Mr. G. Massee, F.L.S., Principal Assistant (Cryptogams), Royal Herbarium, Kew, is well known as a high authority on Cryptogamic Botany, especially on that part of it relating to fungi.

The first chapter deals with general ideas of plant life, giving an account of life and the characteristics of living matter—the cell as the unit of plant structure, the sexual and asexual methods of reproduction and a comparison between animal and plant life.

The remainder of the book is devoted to a consideration of the various divisions of the vegetable kingdom, the relationships of the members of these divisions one to another and the relationships existing between the various groups. Besides this each chapter contains an account of the structure and reproduction of the plants dealt with, and the fossil members of the divisions.

AGRICULTURAL SHOWS.

Dominica.

The sixth annual Agricultural Show held in this island, under the auspices of the Imperial Department of Agriculture, took place on Wednesday and Thursday, February 24 and 25. The show was held in the Botanic Gardens and presented a very attractive appearance. The exhibits represented a wide range of productions and were most tastefully arranged. After an address by the Administrator, the Diplomas of Merit were distributed by the Imperial Commissioner of Agriculture, who expressed himself as thoroughly pleased with so genuine and valuable an effort to promote the agricultural interest of the island.

The Report of the Committee will, it is hoped, be shortly published dealing fully with this interesting and successful show.

Montserrat.

The Agricultural Show in this island was held on Thursday, February 25, in the market place closely adjoining the landing stage. The exhibits were fully representative of the products of the island and showed a steady improvement on those of former years. It was gratifying to observe that all classes of the community cordially worked together in the interests of the show. The most striking exhibits were cotton, onions, honey, and garden vegetables grown by pupils attending the elementary schools. After an address by his Honour F. H. Watkins, the Imperial Commissioner of Agriculture distributed the Diplomas of Merit and heartily congratulated the Committee on the successful results of their efforts.

Antigua.

A very successful Agricultural Show was held at Antigua on Thursday, February 25. The show was opened by his Excellency the Governor, who in a short speech referred with satisfaction to the work of the Agricultural Department and to the obvious improvement in the quality of many of the exhibits.

The most gratifying feature of the exhibition was the very fine show of minor products, especially of cotton and onions. Both of these products were represented by twenty to thirty exhibits in each of the classes and were of exceptional quality, although perhaps the onions were in some cases a little too large, and not sufficiently matured.

The exhibits of meals and starches were again large and showed what might be done in the way of manufacturing food supplies for home consumption.

In all the vegetable and fruit classes the competition was keen; the exhibits were of a much higher standard than before, and here it might be mentioned that there was a large number of exhibits by the peasant proprietors, the number of prizes they obtained greatly exceeding that of previous occasions.

A new feature of this show was the exhibits from elementary schools. The plants exhibited in pots, of which there were about thirty, were fairly well grown, but, as the judges remarked, they might have been arranged so as to be of greater educational value. The exhibit of vegetables from St. Mark's school garden was excellent and does credit to the master and scholars.

The Botanic Station exhibit occupied a separate room. It comprised a number of varieties of yams, sweet potatos, corns, Egyptian and other cottons.

GLEANINGS.

According to the *Maritime Merchant* the imports of molasses into Halifax for 1903 were 17,010 puncheons, 2,093 tierces and 3,733 barrels, as against 13,259 puncheons, 1,236 tierces and 2,424 barrels for the preceding year.

We learn from the St. Vincent *Times* of February 25 that St. Vincent is likely to compete with the other West Indian Colonies in the production of honey. One bee-keeper owns over seventy colonies and intends to increase his apiary.

It is announced that the cotton gins imported by the Government of Trinidad are now in working order at the St. Clair Experiment Station. Planters can have the free use of these gins, but must provide the necessary labour for working them.

Mr. John Belling, B.Sc., writes from the Agricultural School at St. Kitt's that the Barbados blackbirds shipped by the Imperial Department of Agriculture and set free at Stone Foot estate have increased in number. Being unmolested they pick up their food near the estate buildings and seem as fearless as English sparrows.

At a meeting of the Antigua Agricultural and Commercial Society held at Antigua on February 19, a resolution was passed expressing the regret of the Society at the departure of Mr. W. N. Sands, the Honorary Secretary, and its high appreciation of his valuable services to Antigua and to the Society in particular.

Seed of diseased plants often produces diseased seedlings. Sound seed in soil that has borne diseased plants will produce diseased seedlings. Cuttings from diseased plants, even if from the healthy portions, should not be used for propagating unless with precautions against spreading the disease of the parent stock. (*American Gardening*, February 6, 1904.)

The *Journal of the New York Botanical Garden* for January 1904 contains a full account of the tropical research laboratory that is to be established at Cinchona, Jamaica, to which reference has been made in the *Agricultural News* (Vol. II, p. 311, and Vol. III, p. 38). Illustrations are given of some of the buildings which are to be utilized for laboratory purposes.

The *Louisiana Planter* of February 20 contains a paper by Professor R. E. Blouin on the 'comparative results of seedling canes D. 74 and D. 95 with our home sugar-canes.' The results are summarized as follows: 'D. 74 is more vigorous, a more rapid grower, gives a larger tonnage and a larger extraction, and has a larger sugar content, yielding more sugar per ton and giving a greater tonnage per acre than home canes. The same remarks apply, in a lesser degree, to D. 95.'

We learn from the Demerara *Argosy* that the live stock show held at Eve Leary under the auspices of the Board of Agriculture on February 26 was, from the point of view of the class of exhibits, on the whole a success. Unfortunately very bad weather prevailed throughout the day, and this prevented a large attendance.

According to the *Journal of the Society of Arts*, raffia fibre, which is so commonly used for tying up garden plants, is the product of a palm indigenous to Madagascar, whence some 20,000 bales are annually exported. The supply is practically inexhaustible. For export it is merely collected in large skeins, twisted up and plaited, and then baled like raw cotton.

The *West India Committee Circular* of February 16 gives figures showing the consumption of cacao in Europe and the United States over the periods of eleven months (twelve in the case of the United Kingdom and the United States) for the past five years. The total consumption in 1899 was 193,773,600 lb.; in 1903, 241,707,900 lb., an increase of about 25 per cent.

Suggestions have been made from time to time that Indian cattle and other stock might be brought to the West Indies in the emigrant ships, but it has always been pointed out that the Indian Emigration Act would not allow this. Notification has, however, recently been received that the rules have now been so amended as to allow the exportation, under certain conditions, of cattle from India in emigrant ships to any colony, to which emigration is carried on under the Act.

According to the *Agricultural Journal* of Natal for December last, adulterated bees'-wax may be detected by chewing a small piece for a few minutes. If the wax becomes pasty and adheres to the teeth, it is adulterated. Pure bees'-wax is very brittle and should crumble to pieces when chewed. The comb that contains 1 lb. of honey will, when rendered into wax, weigh about $\frac{1}{2}$ oz. It is quite evident, then, that very little wax is consumed by the individual when eating comb honey. It is not at all unwholesome.

We learn from the *Louisiana Planter* of February 20 that the short supply of molasses is being felt in the markets. 'Notwithstanding the immense production of corn glucose, there continues to be a considerable demand for actual molasses, which is ordinarily supplied from Louisiana, Porto Rico, Barbados and Demerara. The exceedingly short crop of Louisiana molasses has diverted the attention of buyers to some extent to Porto Rico and other West Indian molasses, all of which, however, are reported to be in rather short supply.'

Dr. M. Ekenburg, of Gothenburg, Germany, has invented an apparatus by which milk can be rendered to a powder, like flour in appearance, but possessing all the qualities of milk in concentrated form, moisture excepted. This milk flour is said to be completely soluble in water, and can be used for all purposes for which common milk is employed. It is claimed that it does not get sour or ferment, and that it can be kept and transported in tin cans, barrels, bags, etc. The invention is considered to be mainly of importance for the utilization of skim milk, much of which has hitherto been wasted, but which can, in the dry form, be transported easily without loss of quality. (*Queensland Agricultural Journal.*)

MUSK SEED.

Musk seeds are obtained from the musk ochro plant (*Hibiscus Abelmoschus*) which is cultivated on a small scale in some of the West Indian Islands. Watt gives the following information with regard to musk seeds in his *Dictionary of the Economic Products of India*:—'The seeds yield about 6·5 per cent. of an odorous principle and resin. The former is a light-green, non-volatile fluid, having a strong odour resembling that of musk and amber, hence the Arabic name *hab-al-mushk*. Owing to their possessing this principle, the musk mallow seeds are used in perfumery and are known to the trade in Europe as "grains d'ambrette." Piesse in his *Art of Perfumery* writes: "Musk seed, when ground, certainly reminds our smelling sense of the odour of musk, but it is poor stuff at best," and he recommends it only for making cheap sachet powder. According to him the most valuable seeds are imported from Martinique'.

With a view to ascertaining what prospects existed for establishing a trade in musk seeds, the Imperial Commissioner of Agriculture communicated with Messrs. Burgoyne, Burbridges & Co., Wholesale and Export Druggists, of London, and with Mr. J. R. Jackson, A.L.S, asking for further information on the subject.

The reply of Messrs. Burgoyne, Burbridges & Co. was as follows:—'We have the pleasure to advise you that there is a market in London for West Indian musk seed, and the price ranges from 1*s.* to 1*s.* 3*d.* per lb., according to quality. It would, however, not be advisable to ship very large quantities, as the market is easily depressed; but consignments of ½ to 1 ton are generally disposed of without difficulty.'

Mr. Jackson obtained the following information from Mr. George Piesse, of New Bond Street, London, whose work on the *Art of Perfumery* has already been referred to:—

'Musk seed finds but small place with the perfumer and is not worth its cost, being more a flavour than an odour. Musk seeds are also known as "grains d'ambrette", and I believe that the principle consumers are the French and Italian manufacturers of vermouth, etc. The seeds are imported from Java into Europe through Holland, from Martinique through Marseilles, from the British West Indies through the port of London, in the proportion of about five from Java, two from Martinique, and one from the British West Indies. The Java seed is deemed the best and realizes about 1*s.* 6*d.* to 2*s.* per lb., the others about 3*d.* to 6*d.* less.' It is pointed out by Mr. Jackson that the trade must have changed since Mr. Piesse wrote his book in 1891, where it is stated that 'the most valuable seeds are imported from Martinique.' Another correspondent informed Mr. Jackson that it was 'suspected that musk seed is also used for adulterating musk,' and that there is a steady though limited outlet for it. Several references will be found to sales of this product in Mr. Jackson's articles on the London spice and drug markets in the *Agricultural News*. (See Vol. II, pp. 84, 125, 149, 302, 366.) From these it will be seen that musk seed from the British West Indies makes its appearance in the London market every now and then, in small quantities, the price obtained being about 1*s.* 2*d.* per lb.

Musk seed oil is reported on by Messrs. Schimmel & Co. in their *Semi-annual Reports*; in that for October 1900 it is stated: 'We shall continue to keep a large stock of this article, so long as musk seed can be obtained in sufficient quantity.'

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned from a tour of ten days in the Northern Islands on Friday the 4th. instant in the S.S. 'Dahomé. He left on the 7th. instant in the S.S. 'Oruro' for St. Vincent to attend the Agricultural Show and inspect the Central Cotton Factory which is expected to be completed, under the direction of Mr. J. J. Law, the engineer-in-charge, about the middle or end of this month.

Mr. F. R. Shepherd, Superintendent of the Skerrett's Farm, Antigua, on the recommendation of the Governor, has been approved by the Secretary of State for the Colonies to be placed in temporary charge of the Botanic Station and of the Sugar-cane and other experiments in the Presidency of St. Kitt's-Nevis from March 6 last.

As briefly noted in the *Agricultural News* (Vol. III, p. 29), Mr. William Lunt, Curator of the Botanic Station and Agricultural Superintendent of Sugar-cane experiments at St. Kitt's, died somewhat suddenly on January 3 last.

While a member of the gardening staff at the Royal Gardens, Kew, Mr. Lunt was selected to accompany Mr. Theodore Bent's expedition to South Arabia, which left England in November 1893, returning at the end of the following April. Mr. Lunt's special work was to collect plants, seeds and specimens for the Kew collections. A full list of the plants collected by Mr. Lunt will be found in the *Kew Bulletin* for 1894, pp. 328-43, where it is stated that the plants collected included twenty-five new species and two new genera.

In September 1894, Mr. Lunt was appointed Assistant Superintendent of the Botanic Gardens at Trinidad, where he remained until October 1898, when he received the appointment of Curator of the Botanic Station at St. Kitt's, with supervision of agricultural experiments at St. Kitt's-Nevis and Anguilla. The duties of this latter appointment Mr. Lunt continued to carry out with considerable success until his death. Mr. Lunt was held in high esteem by his colleagues and members of the planting community in these islands, and his removal in the prime of life is a source of deep regret to them and to all who were acquainted with him.

The Supply of Nitrogen to Plants. MM. Bouilhac and Giustiniani, in the *Comptes Rendus*, give an account of their experiments in growing buckwheat in a soil destitute of nitrogen, but with which had been incorporated certain algae and bacteria. These latter speedily enriched the soil to such a degree that the buckwheat flourished, and its analysis showed a large percentage of nitrogen, though, as we have said, the soil was originally destitute of that ingredient. The matter is in the experimental stage purely, but there are great hopes that the resources of science will shortly place at the disposal of the cultivator sources of nitrogen at a cheap rate. (*Gardeners' Chronicle*, January 16, 1904.)

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is a report by Mr. J. R. Jackson, A.L.S., on the London drug and spice markets for the month of January 1904 :—

The interest in connexion with the fiscal problem has rather increased than abated during the month, due in a great measure to the opening of Parliament and the excitement surrounding several of the bye-elections. These matters, together with the tension of affairs in the Far East have caused a condition of unsettlement in the markets, especially with regard to camphor and menthol, both of which are certain of advancement in the event of hostilities taking place between Russia and Japan, which at the time of writing are reported to have actually commenced. Towards the end of January the camphor market was in a very excited condition, manufacturers selling only small quantities from stock at considerably enhanced rates.

With regard to articles affecting the West Indies, little or nothing of any special interest occurred during the month, as will be seen from the following details.

GINGER.

At the first spice sales on January 6, ordinary to medium dullish Jamaica sold at 38*s.* to 40*s.*, and fair bright washed at 49*s.*, while wormy, native cut Cochin fetched 39*s.* to 40*s.* A week later, out of 450 barrels of Jamaica offered about 100 sold at 41*s.* 6*d.* for fair, 38*s.* to 40*s.* 6*d.* for small bright in bags, while lean and dark fetched 37*s.* to 38*s.* At this sale 200 bags of Cochin were sold out of 550 offered ; 22*s.* 6*d.* being given for low, brown, wormy Calicut. The following qualities were bought in at the prices named : medium and bold, 60*s.*; small and medium, 45*s.*; ordinary unsorted native cut, 45*s.* Good Bengal was bought in at 26*s.* and fair limed Japan at 25*s.* At the end of the month these prices had changed but little.

ARROWROOT.

Good manufacturing St. Vincent at the beginning of the month sold in quantities at $1\frac{3}{4}d.$ per lb. for barrels and $2\frac{3}{4}d.$ for tins, Bermudan kegs being bought in at 1*s.* 4*d.* At the second sale, on the 13th., the figures stood thus: 400 barrels of St. Vincent fetched from $1\frac{3}{4}d.$ to $1\frac{7}{8}d.$, and 4 half-barrels of Bermuda realized 1*s.* 5*d.* per lb. These prices remained unchanged at succeeding sales.

MACE, NUTMEGS AND PIMENTO.

The markets during the month were generally quiet, but at the last spice sale on the 27th. there was a large supply of West Indian nutmegs offered, 234 packages being disposed of at steady rates. At the same sale 66 bags of fair pimento sold at 4*d.*, out of 319 bags offered.

SARSAPARILLA.

At the first drug sale, on the 7th., the following were the quotations : 1*s.* 1*d.* was demanded for fair, sound, grey Jamaica, inferior coarse sold at $9\frac{1}{2}d.$, sea-damaged 9*d.* and red native 10*d.* Seven bales of sound Guatemala fetched $7\frac{1}{2}d.$, and water damaged 6*d.* A fortnight later the only kind offered at auction was Lima Jamaica for which 11*d.* per lb. was asked.

ANNATTO.

At each of the two sales in the month annatto has been in good supply, but with little demand. On the 7th. 14 packages were offered and 2 sold. Good Madras was held at $3\frac{3}{4}d.$ and 2*d.* was given for mixed sweepings. At the second sale 71 packages were offered and none sold.

LIME JUICE.

This also appeared at the sales on the 7th. and 21st. At the former a quantity of unworked West Indian juice sold at from 9*d.* to $10\frac{1}{2}d.$ per gallon. On the 21st. 6 hogsheads of Dominican unworked realized the same price, and 1 cask of concentrated West Indian (with analysis) sold at £12 10*s.* for 108 gallons. At the same sale a case of West Indian distilled lime oil was sold at 1*s* 3*d.* per lb., and 1 case, out of 5 offered, of Bay oil from Tobago, at 1*s.* 6*d.* per lb.

MUSK SEED.

Five packages of fair quality from St. Lucia sold at $8\frac{1}{2}d.$ per lb. and another lot at from 8*d.* to $8\frac{1}{4}d.$, at the first drug sale, and at the second, a single box from Grenada realized 9*d.* per lb.

KOLA.

It is worthy of note that at the spice auction on the 6th. and at the drug auction on the following day, kola was offered. At the former date 5 bags of fair, dry West Indian realized 5*d.* per lb., while on the next day at the drug sale the same quantity of good bold West Indian halves sold at 6*d.* per lb. A case of fair Ceylon at the same sale brought the same price, while small dull African was limited at 6*d.*, an offer of 4*d.* being refused.

CASSIA FISTULA.

Though no West Indian pods have been reported at the auctions during the month, a parcel of 16 baskets of fair but lean East Indian, slightly wormy, was said to be lying at one of the warehouses. Eight baskets of this consignment were sold privately, 30*s.* being asked for the remainder.

VANILLA.

It may be interesting to note that vanilla has been very much in evidence. At the first sale of the month as many as 2,860 tins, chiefly from the Seychelles, were offered, nearly all of which were sold, the demand being great at the following prices : Fine, 12*s.* to 15*s.* 6*d.*; split, 12*s.* to 14*s.*; medium long, 9*s.* 3*d.* to 10*s.*; medium, 6*s.* 3*d.* to 9*s.*; fair to good short, 4*s.* 9*d.*; and common dry brown, 2*s.* 6*d.* to 4*s.* 9*d.* per lb. This was stated to have been a record sale, the total weight of vanilla disposed of amounting to about $15\frac{3}{4}$ tons.

GUADELOUPE JABORANDI.

A note appeared in the *Agricultural News* (Vol. II, p. 406) on the subject of this new variety of jaborandi. We extract the following reference to it from the *Pharmaceutical Journal* of January 16, 1904 :—

Further experiments as to the physiological action of the alkaloids of Guadeloupe jaborandi are necessary, when larger supplies can be obtained, before it is certain that these leaves can be used as a source of pilocarpine nitrate. At present the pilocarpine nitrate of commerce is obtained chiefly from the leaves of *Pilocarpus microphyllus*, so far as can be judged from the imports. The demand for these leaves is already considerable, orders for 5 or 10 tons being placed at one time.

The discrepancy in the results obtained as to percentage of alkaloid in Guadeloupe jaborandi leaves may possibly be due to the leaves having been collected at different periods of the year.

MARKET REPORTS.

London,—February 16, 1904. Messrs. KEARTON, PIPER & Co., Messrs. J. HALES CAIRD & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR', February 5, 1904; and 'THE PUBLIC LEDGER,' February 13, 1904.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/6 to 35/- per cwt.
ARROWROOT—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/3 to 1/8 per lb.
BALATA—1/8 to 2/- per lb.
BEES'-WAX—£7 5*s.* to £7 7*s.* 6*d.* per cwt.
CACAO—Trinidad, 64/- to 73/- per cwt.; Grenada, 53/- to 62/- per cwt.; Dominica, St. Lucia and Jamaica, 52/- to 61/6 per cwt.
CARDAMOMS—Mysore, 7*d.* to 3/3 per lb.
COFFEE—Jamaica, ordinary, 40/- to 60/- per cwt.
COPRA—Trinidad, £16 15*s.* to £17 per ton, c.i.f.
COTTON—West Indian Sea Island, 1/2 to 1/3½ per lb.
DIVI DIVI—No quotations.
FRUIT—
BANANAS—Jamaica, 5/- to 7/- per bunch.
GRAPE FRUIT—10/- to 11/- per case.
ORANGES—Jamaica, 8/- to 9/3 per case of 150 to 176.
PINE-APPLES—No quotations.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Jamaica, 35/- to 55/- per cwt.
HONEY—Jamaica, 18/- to 30/- per cwt.
ISINGLASS—West Indian lump, 2/4 to 2/11; Cake, 1/5 to 1/6 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 9*d.* to 1*s.* per gallon; Concentrated, £12 10*s.* to £13 per cask of 108 gallons.
LIME OIL—No quotations.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—1/9 to 2/3 per lb.
NITRATE OF SODA—Agricultural, £9 15*s.* per ton.
NUTMEGS—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per lb.
PIMENTO—3¾*d.* to 4⅛*d.* per lb.
RUM—Demerara, 9*d.* to 10½*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
SARSAPARILLA—Jamaica, 1/1 per lb.
SUGAR—Crystallized, 14/- to 16/6 per cwt.; Muscovado, 12/9 to 13/3.
SULPHATE OF AMMONIA—£12 17*s.* 6*d.* per ton.
TAMARINDS—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—February 8, 1904.—'THE MARITIME MERCHANT.'

MOLASSES—Barbados, 29c. to 30c. per gallon. Porto Rico, 36c. to 40c.

Montreal,—February 11, 1904.—MR. ALEXANDER WILLS.
COFFEE—Jamaica, 10c. to 12c. per lb.
GINGER—Jamaica, 8c. to 8¼c. per lb.
MOLASSES—Barbados, 36¼c. to 39¼c. per gallon.
MOLASCUIT—Demerara, $1·32 per 100 lb.
NUTMEGS—Grenadas, 110's 25c. to 26c. per lb.
PIMENTO—Jamaica, 8c. to 8¼c. per lb.
SUGAR—Crystals, $2·00 per 100 lb. in bond.
—Molasses $1·15 per 100 lb. in bond.

New York,—January 22, 1904.—Messrs. GILLESPIE BROS. & Co.

BANANAS—No quotations.
CACAO—Caracas, 13c. to 14c.; Jamaica, 10½c. to 12½c.; Grenada, 12¾c. to 13¼c.; Trinidad, 13c. to 14½c. per lb.
COCOA-NUTS—Trinidads, $17·25 to $18·25; Jamaicas, $25·00 to $27·00 per M., selected.
COFFEE—Jamaica, fair to good ordinary, 7¼c. to 8¼c. per lb.; Manchester grades, 9½c. to 10½c. per lb.
GINGER—Jamaica, 6½c. to 7c. per lb.
GOAT SKINS—Jamaicas, 50c. to 54c. per lb.
GRAPE FRUIT—$4·00 to $6·00 per barrel.
ORANGES—$3·25 to $3·50 per barrel.
PIMENTO—7½c. per lb.
RUBBER—No quotations.
SUGAR—Centrifugals, 96°, 3 11/32c.; Muscovados, 89°, 2 13/16c. to 2⅞c.; Molasses, 89°, 2 19/32c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—February 27, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·60 per 100 lb.
CACAO—$11·50 per 100 lb.
COCOA-NUTS—$9·37 per M. for unhusked nuts.
COFFEE—Jamaica and ordinary Rio, $10·00 and $12·00 per 100 lb. respectively.
HAY—$1·00 per 100 lb.
MANURES—Nitrate of soda, (none in stock); Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
MOLASSES—14c. per gallon (puncheon included).
ONIONS—$4·00 per 100 lb.
POTATOS, ENGLISH—$2·20 per 100 lb.
RICE—Ballam, $5·25 per bag (190 lb.); Patna, $3·60 per 100 lb.
SUGAR—in hhds., $1·30 per 100 lb. (packages included).

British Guiana,—February 11, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $8·50 per barrel.
BALATA—40c. to 42c. per lb.
CACAO—Native, 11c. to 13c. per lb.
CASSAVA STARCH—$6·50 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 13c. to 14c. per lb. (retail).
—Creole, 13c. per lb.
DHAL—$3·70 to $3·80 per bag of 168 lb.
EDDOES—$1·80 per barrel.
MOLASSES—Vacuum Pan yellow, 16c. per gallon, (casks included).
ONIONS—4c. to 5c. per lb., ex store; Garlic, 6c. to 7c.
PEA NUTS—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
PLANTAINS—24c. to 72c. per bunch.
POTATOS, ENGLISH—$3·00 to $3·25 per barrel.
RICE—Ballam, $4·60 per 177 lb., ex store; Creole, 18c. to 20c. per gallon (retail).
SWEET POTATOS—Barbados, $1·44 per barrel.
TANNIAS—$2·16 per bag.
YAMS—White, $1·44 per bag.
SUGAR—Dark Crystals, $1·75; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00 to $5·00 per M.

Trinidad,—February 25, 1904.—Messrs. GORDON, GRANT & Co., and Messrs. EDGAR TRIPP & Co.

BALATA—No quotations.
CACAO—Ordinary, $12·50 to $12·75; Estates, $13·75 per fanega (110 lb.).
COCOA-NUTS—$18·00 per M., f.o.b., selected in bags of 100, (husked).
COCOA-NUT MEAL—1¼c. per lb.
COCOA-NUT OIL—55c. per Imperial Gallon (casks included).
COFFEE—Venezuelan, $8·00 per 100 lb.
COPRA—$2·75 to $3·00 per 100 lb.
ONIONS—$2·70 per 100 lb.
POTATOS, ENGLISH—$1·00 per 100 lb.
RICE—Yellow, $4·40 to $4·50; White Table, $5·25 to $5·75 per bag.
SUGAR—Yellow Crystals, $2·25 per 100 lb.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 51. BARBADOS, MARCH 26, 1904. PRICE 1*d.*

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Agricultural Shows.

AS recorded elsewhere in these pages, several successful Agricultural Shows have recently been held under the auspices of the Imperial Department of Agriculture. These deserve more than a passing notice.

The first Agricultural Show held for many years in that island was opened at Nevis on December 3, 1903. It was organized by the Rev. E. M. Johnson and for an initial effort it was distinctly promising. The fourth annual Local Exhibition at Barbados was held at Lower Estate, St. Michael, on January 12, 1904. The prizes were distributed by Sir Frederic Hodgson. The sixth annual Agricultural Show at Dominica was held in the attractive Botanic Gardens in that island on February 24 and 25. The exhibits were arranged in tents and comprised some of the best productions of the tropics. The fourth annual Show at Montserrat was held in the Market Place on February 25. The exhibits of cotton, onions, honey and of English and native vegetables were of special interest as indicating the undoubted capabilities of the island.

A successful Agricultural Show, the fourth of the series, was held at Antigua, also, on February 25. This was opened by Sir Gerald Strickland, who drew special attention to the fine exhibits of minor products, such as cotton and onions.

More recently an Agricultural Show, the first, probably, for twenty years, was held at the Agricultural School at St. Vincent on March 10. The exhibits of cotton were especially good, also the cattle and small stock.

At the Agricultural Shows at Dominica, Montserrat and St. Vincent, the Imperial Commissioner of Agriculture was present and distributed the Diplomas of Merit.

Marked features in connexion with these shows were the cordial manner in which the members of the planting community co-operated with the small proprietors and settlers and the evident keenness of all in the competition for prizes and diplomas.

In cases where the Shows had been carried on for some years, the vegetable products, especially, bore evidence of considerable advance in cultivation and preparation for market. The educational value of these Shows is, therefore, assured. It is a matter of regret that it is not possible to speak so favourably of the exhibits of domestic animals. It is evident that in the small islands, at all events, these have not received the attention they deserve. With few exceptions the horses and cattle have been stunted and in poor condition. Further, small stock, such as pigs, sheep, goats, poultry and rabbits, exhibited by peasants and settlers, have, almost invariably, shown an entire absence of selection in breeding. It is hoped that the considerable efforts now being made by the Department to introduce pedigree animals will have appreciable influence in this direction. When possible, the Botanic Stations have organized special exhibits consisting of new varieties of yams, sweet potatos and other food crops. The Agricultural Schools have followed a similar course; while the pupils attending these Schools have forwarded for competition amongst themselves the produce of their own plots consisting of English and native vegetables. A new feature at all the recent Shows has been the attention given to the exhibits of plants and produce grown by children attending the Elementary Schools. In some cases the plants have been exhibited in the original pots or boxes. In others the produce only has been shown. Special prizes have been arranged to suit both classes of exhibits. The success of these efforts has been of a gratifying character. The interest of the teachers has been thoroughly enlisted, and where diplomas have been gained these have been framed and hung in the school-rooms.

As regards future Agricultural Shows, it is recommended that active steps be taken to organize these and issue the prize lists at least six months before the date fixed for the Shows. It is desirable that local committees be appointed in each district to afford information and arrange for selecting and forwarding representative exhibits. The Chairman of each local committee might call a meeting of the land owners and cultivators in his district and infuse a spirit of rivalry as against other districts. This plan has been carried out with great success at Dominica and it might usefully be followed in the other islands.

There can be no doubt that the general effect of these Shows cannot fail to have a beneficial and stimulating influence on all agricultural industries. We heartily congratulate those who have already taken an active part in them, and we bespeak the cordial support of all who desire to promote intelligent and progressive action in developing the material resources of these colonies.

SUGAR INDUSTRY.

Growth Variation of the Sugar-cane.

Some good examples of seedling sugar-canes exhibiting curious growth variations have recently been forwarded by Mr. Robert Ward, Agricultural Assistant, British Guiana, to the Imperial Commissioner of Agriculture for inspection :—

(1) Seedling No. 5,406, showing a succession of nodes with undeveloped eyes. In one specimen there were no fewer than six nodes without buds. This appears to be a fairly common feature of this variety.

(2) Seedling No. 1,896, showing two eyes developed side by side from the same node.

(3) Seedling No. 4,805, in which there is a large cluster of buds which have developed simultaneously at the top of the cane so as to form a kind of broom.

Drawings have been made of these canes, showing the variations mentioned, to be kept at the Head Office of the Imperial Department of Agriculture for the West Indies as a permanent record of these curious growths.

The Deterioration of Cut Sugar-cane.

The following is a brief summary of a paper on the above subject in the *Agricultural Ledger* (1903, No. 6) and contains information that will probably be of interest to sugar planters who have to rely on wind power for crushing their canes. The deterioration referred to, in canes which have been cut for over seventy-two hours, unfortunately too often occurs in Barbados :—

It is well known that when the outer wall of the sugar-cane is broken and air thereby admitted to the cell contents, the sucrose or crystalline sugar contained in the latter readily changes into non-crystalline invert sugar. This action seriously affects the value of the cane to the sugar manufacturer, and it is therefore desirable that canes should be treated at the factory as soon as possible after cutting. Most of the experiments hitherto conducted have consisted in keeping five to six cart loads or bundles of canes and grinding one cart load every day, the analyses of the juice being the criterion by which to judge the deterioration. There was, however, no guarantee whatever that the different cart loads or bundles had the same sucrose contents to start with, and

the experiments, although carefully conducted, were of little value owing to lack of uniformity in the material used.

In the experiments recorded in the *Agricultural Ledger* this difficulty was avoided, and the results show in a striking manner the amount of deterioration (that is, the decrease of the available sucrose) which occurred in the course of periods varying from one to five days.

It having been ascertained from preliminary experiments that the act of cutting resulted in a homogeneous material so far as the different kinds of cane were concerned, five varieties were divided into five or six uniform samples and the percentage of available sugar was determined in each at intervals of one day. Taking an average of the experiments the following figures are shown :—

Days cut...	0	1	2	3	4
Available sugar (original sample = 100)	100	97·3	92·0	78·6	67·9
Total loss available sugar	0·0	2·7	8·0	21·4	32·1
Daily loss available sugar	0·0	2·7	5·3	13·4	10·7

For the first two days the loss is relatively small, but after seventy-two hours about one-fifth of the available sugar disappears.

The facts demonstrated by these experiments are not new to the sugar manufacturer. Experience has already taught him, at his own expense, that he gets a larger yield of sugar from fresh canes than from stale ; it is, however, very doubtful whether he knows that even the gain of twenty-four hours at the right moment will give him a considerably cheaper sugar.

The Diffusion Process of Extracting Sugar from Sugar-cane.

The *Agricultural Ledger*, 1903, No. 8, is devoted to an account of the diffusion process of extracting sugar from the sugar-cane. The value of this paper is purely historical, since it is not likely that the diffusion process will be capable of successful employment in the West Indies, as will be seen from the following extracts :—

The diffusion process has not ousted the crushing process, and the reasons are as follows :—

Diffusion needs—

(1) more fuel,
(2) a greater supply of skilled workmen,
(3) the utmost regularity ; for it works as an iron system.

In return, it—

(1) extracts more sugar, and
(2) gives a juice purer and easier to work with.

Prinsen Geerligs, reviewing these, says :—

'A great advantage of mills is that their capacity permits more variations of output than is the case with the diffusion battery. If necessary, it is possible (when, for instance, burnt canes must be crushed at once) to crush 600 tons a day with a milling plant intended to crush, say, 450 tons, provided the other stations of the factory can tackle and work up all the juice. It is evident that such an enormous increase of work done cannot but influence its quality, so that a poorer extraction will be the consequence ; and granting even this, we must not overlook the fact that a diffusion battery may conceivably accomplish such excess of work. But even if we allow a very poor extraction, it would not be feasible to work up all the canes, as the slicing machine might prove insufficient to slice properly all the surplus cane. On the other hand, the advantages of diffusion are, that it extracts nearly all the sugar from the cane in the form of a pure juice, the greater part of the impurities remaining behind in the bagasse, so that the juice is easily workable. There is also less danger of stoppage from breakdown, for if one diffuser gives way, it is disconnected and the work carried on with the others, which is not so feasible with mill work.

'The disadvantages are that more hands are required by the diffusion system, and that they must be chiefly workmen acquainted with diffusion. Moreover, the diffusion juice is very much diluted (up to 20 per cent. and sometimes beyond), and a large quantity of steam is required to evaporate the diluting water. It is true that, in some factories working with the mill, the dilution by maceration is not less than 20 per cent., but only in case they are crushing canes with a high saccharine content, which renders such dilution worth the while ; on the other hand, it is not possible in diffusion to diminish the dilution in the case of poor cane, so that poor and rich juices are equally highly diluted. Finally, the slicing machine costs a great deal in steam and maintenance, as it has very heavy work to do in cutting up all the hard cane into thin slices, and the exhausted slices contain so much water that they have to be freed from serviceable fuel. Naturally the mill has nothing like so much to do as when it is used for cane crushing, but still it is a great inconvenience to be obliged to have along with the diffusion battery also a mill apparatus. Then the bagasse, which is first cut and then ground and dried, is much finer and more powdery than cane bagasse, which has only been ground, and it supplies a less valuable fuel. Against the advantages of extracting more sugar and having a pure diffusion juice, along with regular working, we have thus to put the disadvantages of requiring more and also more skilled workmen, being compelled to use more steam, and getting a less valuable fuel as an after-product ; whilst the capacity of the station does not adapt itself so well to a decrease or increase in the quantity of cane to be worked up as with a milling plant.'

ARBOR DAY.

The wise idea of man's duty in tree planting was common in many lands. An old Prussian ordinance decreed that every couple on their marriage day should plant six fruit trees and six oaks. The Italians had a proverb : 'If you wish to leave a competency to your grandchildren, plant an olive.'

But the Americans, going, as usual, one better than anyone else, have founded a national institution on the idea.

That the true basis of national wealth is wood, not gold, is an idea that has taken firm root in the States. Trees preserve water, preserve the soil from floods, temper climate, protect birds, yield fruits for man's enjoyment, provide material for his work and fuel for his fire. And, above and beyond all, they make the beauty of a country. (*Pearson's Magazine.*)

WEST INDIAN FRUIT.

MANURING CITRUS TREES.

The following letter, dated March 8, 1904, relating to the effect of pen manure upon citrus fruits, has been received from Mr. E. A. Agar, of La Haut, Dominica. The matter that is brought forward by Mr. Agar is of considerable interest to fruit growers in these islands:—

It is a well-recognized fact in Dominica that the use of pen or stalk manures for citrus trees results in increasing the size of the fruit at the expense of the texture. Limes manured in this manner approximate to lemons, while orange trees similarly treated bear fruits of enormous size with very thick skins, woody pulp, and little flavour. Until quite recently it never occurred to me that this was not an established fact throughout the West Indies; but from something said to me the other day by a resident in a neighbouring island, it appears that it may not be so. It would be of great interest to planters in this island to learn whether this result of the use of pen manure has been noticed by orange growers in other islands; and if so, what manures they use.

JAMAICA FRUIT INDUSTRY.

A report on the fruit industry of Jamaica prepared by Mr. W. E. Smith, General Manager of the Trinidad Government Railway, who recently visited Jamaica as the special representative of the Trinidad Agricultural Society, was laid before the Society on March 8, and printed in the *Port-of-Spain Gazette* for March 9. This report will, no doubt, be published in the *Proceedings* of the Society, but the following extract may be of interest to readers of the *Agricultural News*:—

The value of Jamaica's fruit exports exceeds £1,000,000 annually, or over 60 per cent. of the total exports. Nearly seven-eighths go to the United States, and the remainder to the United Kingdom and other British possessions. It is estimated that 33,000 acres are under banana cultivation.

The variety grown is the 'Martinique' or 'Gros Michel'. A full bunch, or 'straight' as it is technically known, consists of nine hands, eight hands count as three-quarters, seven hands as a half, and six hands as a quarter. The prices paid by buyers and shippers vary according to the season and the exigencies of supply and demand. For the English market the best prices are obtainable in the summer and autumn months, and for the United States from April to August. So far as I am able to ascertain, the highest figures reach £12 per 100 bunches, and the lowest £5, the average being £7 10*s.*, or 1*s.* 6*d.* per bunch of nine hands. Delivery in all cases to be made at the nearest dépôt or railway station.

The important lessons in cultivation they seem to have learnt in Jamaica may briefly be summarized as follows:—

(1) Thorough preparation of the land before planting, good drainage, and free use of the plough, fork and hoe afterwards. In other words, nothing but high cultivation pays in the long run.

(2) Planting at such time only, and pruning of suckers, as will ensure fruiting and proper rotation during those months when the highest prices prevail.

(3) Care in cutting, handling and transporting the ripe fruit, without which everything else counts as nothing.

A CURIOUS EAST INDIAN TREE.

Specimens have recently been sent to the Imperial Department of Agriculture of some fruits and twigs of *Oroxylon indicum*, a native of Ceylon, Burma, India, Malaya and Cochin China. The specimens came from a tree growing at Bulkley estate, St. George, Barbados. There are also specimens of this tree at Codrington College and Dodds Experiment Station.

Watt in his *Dictionary of the Economic Products of India* gives some interesting information as to the uses of this tree. The bark and fruits are used as a mordant in dyeing and tanning, while the large, thin, membranous seeds are employed in lining hats and are placed between two layers of wicker work to make umbrellas. The root-bark and decoctions made from it are much used medicinally by the natives of India, being utilized for very various disorders, both of man and other animals. The wood is yellowish-white and is said to be so soft as to be unfit for use.

The tree is a member of the natural order *Bignoniaceae*, and attains a height of 25 feet to 40 feet. The leaves are 2 feet to 4 feet across, and are twice or thrice ternately pinnate. The flowers are white to purple in colour and occur in racemes 10 inches long, the individual flowers being $2\frac{1}{2}$ inches long and 2 inches to $3\frac{1}{2}$ inches across. The fruits are interesting; they are long, sword-shaped capsules, 1 foot to 3 feet long, by 2 inches to 3 inches across and only $\frac{1}{3}$ inch thick. The seeds are disc-shaped, white and thin; they have a thin, membranous wing all round, except at the base: with the wing they may measure 3 inches by $1\frac{2}{3}$ inches, and they are a very good example of an adaptation to wind distribution.

COTTON.

Cotton Notes.

The larger the experience gained in regard to the best variety of cotton, the stronger is the conviction that Sea Island cotton is the only one worth growing in the West Indies.

It fetches double the price of any other cotton, the area within which it can be grown is strictly limited, and in a general decline of values the Sea Island will always continue to fetch the best prices.

Further, it is orginally a native of the West Indies, and already Sea Island cotton recently grown in its old home is regarded as equal to the best grown in the Sea Islands.

Many people attracted by the hardy sorts of short-staple cotton trees growing in half-wild condition in these islands have jumped to the conclusion that these might be so improved by cultivation as to afford better returns than the highly-bred forms of Sea Island cotton.

To begin with, it would probably take twenty years to produce from these semi-wild trees a variety of long-staple cotton equal to the best Sea Island cotton. In every way it would be more advantageous, at present, to begin where the Sea Island planters have left off rather than lose time and money in experiments that may or may not be successful.

The reason why Sea Island cotton has not in every instance proved satisfactory is due to the unsuitable conditions under which it has been tried. The land has probably been either too poor or too clayey, the rainfall has been too heavy and, generally, the conditions necessary to success have not fully been understood.

The opinion of one of the largest cotton growers in St. Kitt's, based on the experience gained during the last two years, is that provided exactly the right kind of land is selected for planting and the worm is kept in check, the cotton industry should be more remunerative than sugar and possibly any other crop that could, at present, be grown in that island.

It is hoped, in the further trials to be carried on this year, that many of the difficulties hitherto encountered will be overcome. The soil should be deep and loamy; if not fertile, it should be manured and well cultivated; selected seed only should be planted, and the cotton fields should receive careful and constant attention so that the worm and other enemies may effectually be dealt with.

The idea put forward by the Imperial Department of Agriculture to provide a series of popular lectures, with lantern illustrations, to be given in connexion with the cotton industry has been received everywhere with great interest. It is hoped by these means to place useful information within the reach of all concerned, and make them thoroughly familiar with the details of cotton cultivation as also the best methods of dealing with the worm and other pests.

Apparently, St. Vincent is one of the few islands in the West Indies where the cotton worm and other pests have not made their appearance this year. The cotton stainer is present but it has done little or no harm. Those who propose to come out to the West Indies to embark in cotton planting would do well to visit St. Vincent and study its prospects as a cotton-growing island. The St. Vincent Grenadines, especially Bequia, are also well adapted for cotton growing, and land is obtainable on easy terms and labour is available at moderate rates.

St. Vincent.

The following notice to small proprietors has been issued in St. Vincent :—

The authorities of the Agricultural Department are prepared to buy seed-cotton, for the present, of the proprietors of small cultivations. The cotton must be dry, all trash, pieces of leaves, etc., must be carefully removed beforehand.

Clean, white, long-staple, Sea Island cotton will be bought at 4c. per ℔ of seed-cotton.

Clean, white, short-staple, Upland will be bought at 2c. per ℔. of seed-cotton.

Freight Rates on Cotton.

The following information in respect of freight rates on cotton has been received from Messrs. Clairmonte, Man & Co., the Agents of the Quebec Steamship Company at Barbados :—

We will take any cotton you may have to ship to Manchester or Liverpool, via New York, at the rates named in your letter, say, 40c. per 100 ℔. for not less than 10 tons at any one time, and at 45c. per 100 ℔. for any quantity under 10 tons. With regard to the expenses at New York, we will find out from the Agents there what these will amount to, but we do not think that the charges will be very heavy. Of course the charges at New York will be extra to the rates of freight named above.

Cotton in the West Indies.

The following is an extract from an account of the work of the British Cotton Growing Association by the Vice-chairman (Mr. J. Arthur Hutton) published in the *Textile Mercury* of February 20, 1904 :—

It is perhaps not generally known that at one time we derived our principal supplies from the West Indies, and it is almost an irony of fate that we should again be turning our attention in that direction, and that there is a possibility of the unfortunate sugar planters of those islands finding their salvation, not in sacrifices on our part to revive their decaying sugar industry, but in the growth of cotton. At the commencement of the last century we obtained 40,000 bales, or about half of our total supplies, from our West Indian possessions, and it was not until the year 1802 that our imports from the United States for the first time exceeded those from the West Indies. In 1902, our total imports of cotton from our old sources of supply were less than 1,000 bales. A special grant of £400 was made by the Association to the West Indian Governments for the encouragement of cotton cultivation, and we followed this up by supplying seed, gins and presses. The question has been taken up most vigorously by the local authorities, and Sir Daniel Morris, Imperial Commissioner of Agriculture, is taking the deepest interest in the question. He has visited most of the islands and also British Guiana, delivering addresses and advising the farmers to go in largely for cotton. In addition to that, he has paid a special visit to the United States in order to study American methods of cultivation.

TURNER'S HALL WOOD.

The only portion of the tropical forest that once covered the island of Barbados consists of a few acres known as Turner's Hall wood, in the parish of St. Andrew, about 12 miles from Bridgetown.

In 1848, Sir Robert Schomburgh referred to it as follows:—'The lover of Nature can only hope that this relic of the former forest of Barbados may be kept sacred for the instruction and study of future generations.'

In July 1900, an arrangement was entered into by Mr. George Sealy, the Attorney of Turner's Hall plantation, to preserve carefully this small patch of forest as a 'Nature Garden' and as a place of interest from an historical, as well as a scientific, point of view to residents and those who may from time to time visit the island.

It is a pleasure to place on record that the promise made by Mr. Sealy has fully been carried out, as shown in the following copy of a letter addressed to him by the Imperial Commissioner of Agriculture:—

Barbados, February 22, 1904.

With reference to my letter, No. 947 of April 18, and your reply of April 26, 1900, relative to the preservation of the remnant of the indigenous forest of the island existing at Turner's Hall plantation, I have pleasure in informing you that I visited this interesting locality on Saturday last and I was very gratified to observe that since my last visit the trees and undergrowth appear to have been looked after very carefully and altogether they present a very luxuriant condition in marked contrast to the scattered patches of woodland in other parts of the island.

I quite appreciate the difficulties that have been met with in endeavouring to protect Turner's Hall wood from injury, and it must be a source of gratification to Sir Richard Fitzherbert and yourself to realize that this singularly attractive patch of forest is now in such a condition as to afford a good idea of the character of the forest growth that once covered the greater part of this island.

I trust that it will be found possible still to continue the protection given to Turner's Hall wood and that it will be preserved strictly from trespassers of every kind. Possibly there is no spot anywhere in the West Indies that deserves to be so jealously guarded from injury.

(Sgd.) D. Morris.

KOLA NUTS.

Several references have been made in the *Agricultural News* to the different kinds of kola that exist in West Africa and in the West Indies, and to the fact that the kind with two cotyledons is preferred in the market. This was also the subject of an article in the *West Indian Bulletin* (Vol. IV, pp. 182-8), and further inquiries have been made by Mr. J. R. Jackson, A.L.S., who has contributed the following notes:—

In connexion with the trade in kola and the question of the identification of the species yielding the different forms of seeds known in commerce, which has formed the subject of a special article in the *West Indian Bulletin* (Vol. IV, pp. 182-8), the following extracts from letters I have received in answer to my inquiries on the subject will be of interest. They are the opinions of experts both in London and Liverpool. The former writes:—

'So far as London is concerned, there is a kind of famine in kolas West Indian kolas are preferred to West African in this country and the halves (as the two-cotyledon ones are called) are preferred to the quarters. In London 6*d.* per lb. is obtained for good halves and the same article sells at from 1½*d.* to 2*d.* in Liverpool where most of the West Indian kola nuts are imported. The reason of their low price in Liverpool is that they are bought on the quay and the buyer has to pay all dock and delivery charges. Fresh kola nuts bring a higher price than dried on account of the fact that the kolanin exists in these in combination with the body which forms kola red, hence, if a preparation contains undecomposed kolanin, that substance is slowly split up in the body with the consequent sustaining action that comes from slow physiological influence. The demand for kola nuts in this country has gone off very materially. They are scarcely used at all in pharmacy, and Tibble's Vi-Cocoa people are probably the biggest buyers. Two or three years ago there was a very large demand for the nuts in this country for the purpose of making various aerated beverages, but the public have got back to lemonade and ginger ale and very little kola is now used. In France where aperitives and medicated wine are much more used than in this country, and the need for remedies for troubles that follow excess is greater, kola is largely used.'

Little more than the above information was gained from my inquiries in Liverpool further than to endorse the opinion that the West Indian nuts are much preferred by English buyers, as they are considered superior to the West African, and that preference is also given to those seeds which have the two cotyledons joined together. Supplies are also reported as very scarce and consequently higher prices have been realized, though as a rule the average price is about 2*d.* per lb. At this rate it is considered there would be a brisk market for kola of good quality, as many inquiries are again being made for them.

CORN STALKS FOR HAY.

We take the following note on the value of corn stalks as fodder and their preservation in the form of hay, from the *Journal of the British Honduras Society of Agriculture and Commerce*:—

The value of the maize or corn stalk as a hay or feed for stock, especially cattle, has too long remained unrecognized. Hundreds of acres of corn are grown and no use is made of the stalks after the cob has been removed. There is no reason why this really valuable stock food should not be highly appreciated. Every year this crop is grown and the stalks are allowed to go to waste, while thousands of dollars worth of hay are imported to feed cattle and horses. But until this idea receives practical acceptance, the stock interest will remain, as now, ignorant of the real utility of one of the most valuable of fodder crops.

To harvest and cure a crop of corn stalks is not a difficult matter. Commonly the ears of corn reach an advanced stage of ripeness long before the stalks and blades of the plant have ceased to be green and juicy; then the ears of corn may with safety be removed from the stalks any time after the grain has become firm, a condition clearly indicated by the dense glazed look of the corn grains. If the hay, therefore, be gathered at this stage and put away under shelter from the weather, it will keep good almost indefinitely. It is doubtful whether any other forage crop will produce so large an annual growth of good stock food as corn.

ARTIFICIAL VANILLA.

The following interesting information on the production and manufacture of Vanillin, or artificial Vanilla, prepared by Dr. Wyndham R. Dunstan, F.R.S., Director of the Imperial Institute, has recently been communicated to this Department under instruction from the Secretary of State for the Colonies.

The subject closely concerns the West Indies, as efforts to establish a vanilla industry are being put forth at Dominica, Trinidad, Jamaica and other colonies :—

Vanillin is the constituent to which vanilla owes its aroma and flavour. It was discovered in 1858 by Gobley, and was subsequently investigated by a number of chemists, notably by Tieman, who first prepared it artificially from coniferin, a glucoside found in certain coniferous plants. Since that time a large number of processes for the artificial preparation of vanillin on a commercial scale have been devised. The first of these to meet with commercial success was that of De Laire (English Patents: 1890, No. 17,547 : 1891, No. 17,137), who used as a starting point *eugenol*, the substance to which oil of cloves owes its characteristic odour. De Laire's process, either in its original form or slightly modified, was worked in France by De Laire & Co., and in Germany by Haarmann and Reimer, during the period 1891-6, apparently under an agreement to avoid competition in prices. About 1897, however, a period of competition set in between the French and German makes, which was further accentuated by additions, in France, Germany and Switzerland, to the number of firms making vanillin. The result has been that the price of this product, which was £9 per lb. in 1890, has steadily fallen, until in November last it was quoted at £1 1*s*. 4*d*. per lb. It is probable that all the vanillin so far placed on the market has been made from eugenol, and its price has therefore been governed by that of oil of cloves as the raw product. In 1901, however, a patent (No. 310,983) was taken out in France by Vigne, in which an electrolytic method for the preparation of vanillin from sugar was described. If the claims of the inventor are borne out by practical trials on an industrial scale, it is probable that a further reduction in price may be expected, owing to the great difference in cost of the two raw products eugenol and sugar.

There is no trustworthy information as to the extent to which artificial vanillin is manufactured and used at the present time, but to judge from the number of firms engaged in its production, the amount must be considerable.

As regards the effect of the manufacture and sale of 'artificial vanillin' upon the demand for vanilla, it is remarkable that this has up to the present been comparatively slight. When it is considered that vanilla is employed principally as a flavouring agent, and that its value in this respect depends upon the amount of vanillin it contains, it is curious that so recently as November last good qualities of vanilla should be saleable at 17*s*. to 19*s*. 6*d*. per lb., whilst the equivalent amount of artificial vanillin, for flavouring purposes, could be obtained for about one-thirtieth of this cost. It is probable that this preference for vanilla over artificial vanillin is due partly to conservatism on the part of the consumers, and partly also to a somewhat widespread belief that vanillin does not wholly represent the flavour of vanilla, which, it is alleged, is partly due to minute quantities of other aromatic substances present in the plant. Some evidence in favour of this view is furnished by the statements made at various times by chemists who have examined particular varieties of vanilla, and have isolated, in addition to vanillin, small quantities of heliotropin, benzoic acid, etc. These substances are, however, both cheap and readily obtainable, and if necessity arose, it would be a very easy matter to mix them in a proper proportion with vanillin, in order to modify the flavour of the latter in the required direction.

The foregoing statement of the present condition of vanillin manufacture indicates clearly the possibility in the near future of the replacement of vanilla as a flavouring agent by vanillin.

It is difficult to obtain reliable statistics of the production of vanilla since the cultivation of this product is so widely distributed in tropical countries, and the imports of it into the principal consuming countries are comparatively of so little value that they are rarely separately given. The United States Trade Returns for 1902, however, give a table of the imports of vanilla into that country for the decennial period ending in 1902, of which an abstract is given below.

IMPORTS OF VANILLA INTO THE UNITED STATES OF AMERICA.

Year.	Weight. lb.	Value. $.	Average value per lb. $.
1894	171,556	727,853	4·2
1896	235,763	1,013,608	4·2
1899	272,174	1,235,412	4·5
1900	225,966	1,209,334	4·7
1901	248,988	875,229	3·5
1902	361,739	859,399	2·3

These figures show that, although there is at present no falling off in the demand for vanilla, there has been a great decline in value.

The same state of things is shown by the results of the two auctions held in London in February and November of last year. At the former, 2,800 tins were sold and at the latter 1,410 tins. These quantities are in excess of those of former years. The prices obtained in February ranged from 22*s*. 6*d*. per lb. for best qualities, to 14*s*. 6*d*. for somewhat short, chocolate-coloured beans, and 7*s*. 6*d*. to 11*s*. 6*d*. for 'foxy brown' beans. In November the best qualities realized only 17*s*. to 19*s*. 6*d*. per lb.; short beans from 8*s*. 6*d*. to 11*s*., and poor qualities 4*s*. to 7*s*. per lb.

It is almost impossible to give accurately the total annual production of vanilla at the present time, but it may be estimated at about 350 tons, of which about 150 tons are produced in the British colonies and Bourbon, and the remainder in Mexico. Such statistics as are available indicate that the total production has remained almost stationary during the last few years, the increased output from Seychelles and Mexico being compensated by smaller exports from Mauritius and Bourbon. This being the case it is evident that the depreciation in value of vanilla must be ascribed almost entirely to the competition of vanillin as a flavouring agent. In this connexion it is desirable that it should be known that the so-called 'artificial vanillin' is identical in every respect with the vanillin contained in vanilla, and to which the flavour of the plant is chiefly if not entirely due. For this reason it is not possible to encourage proposals to prevent the sale of vanillin as a 'substitute' for vanilla.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 79 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, MARCH 26, 1904. No. 51.

NOTES AND COMMENTS.

Cotton Cultivation.

We would remind our readers that the number of the *West Indian Bulletin* just issued (Vol. IV, no. 4) contains full information in regard to Sea Island cotton in the United States and in the West Indies. As the number of copies is limited, we advise those who are interested in cotton growing to obtain this report and read it carefully in order that they may become thoroughly familiar with the requirements of the industry. The report is on sale by the London and all local agents (see p. 79 of this volume): price 6*d.*, free by post 8*d.*

Onion Cultivation.

Seven hundred pounds of the best Teneriffe onion seed have been ordered through the Imperial Department of Agriculture for planting in the West Indies in August next.

In this connexion it may be mentioned that at Antigua several areas, varying from 6 to 15 acres, were planted, this year, with onions. These onions occupied the ridges between the growing canes so that their cultivation entailed comparatively small additional expense. The net income from the onions so grown has, in some years, reached £8 to £10 per acre. There is a considerable local demand for onions in these colonies; and they might also be shipped to New York. The best time of the year for West Indian onions to arrive in New York is from the middle of January to the middle of March, before the Bermuda crop is due.

Barbados Fish-curing Factory.

From a first report, presented by the Manager of the Barbados Fish-curing Factory, it would appear that 81,000 flying-fish have been received at the factory, and 135 barrels have been cured and disposed of to date. The general agents are Messrs. Hänschell & Co., Bridgetown. The fish is also on sale by Messrs. J. R. Bancroft & Co., W. L. Johnson & Co., F. Norman Roach & Co., and others. The fish is said to be in good demand locally and 71 barrels have been shipped to, and have obtained good prices at, Trinidad, Demerara and other markets.

Quotations for Cotton.

As announced in the last issue of the *Agricultural News* (Vol. III, p. 88), the quotations for cotton in the public telegrams now refer to Sea Island cotton.

The following telegram from the Superintendent of the West India and Panama Telegraph Company, Ltd., dated March 8, 1904, gives further information on this matter:—

> Our quotation of Sea Island cotton on 5th. was for best Barbados quality, which appears to be equivalent to medium fine Sea Island as per quotations at top of Liverpool Association's Circular, and it is our intention of quoting the latter quality, weekly; but I am asked by my Board to ascertain from you if it will fulfil requirements.

To this the Imperial Commissioner of Agriculture replied: 'Quotations for medium fine Sea Island cotton as per quotations at top of Liverpool Association's Circular would, I believe, suit present requirements in West Indies.'

Cotton Prospects in British Honduras.

Among the subjects discussed at the Annual General meeting of the British Honduras Society of Agriculture and Commerce, that of cotton growing occupied a prominent place. A detailed report on the experiments that have been carried on during the latter half of 1903 was submitted by Mr. Campbell, the Curator of the Botanic Station.

About ½ ton of cotton seed—Sea Island, Egyptian and Peruvian varieties—presented by the British Cotton Growing Association, was distributed free to persons expressing their willingness to plant cotton.

Several planters carried out experiments on a small scale, that is, on plots varying from 1 acre to 7 acres. On the whole, these experiments have been successful, the cotton bearing well. Some trouble was experienced with the cotton worm, there being no Paris green at hand.

Experiments to test the suitability of different varities of cotton, carried out at the Corozal and Stann Creek Botanic Stations, do not appear to have furnished any very definite results. The results of the whole experiments are, however, sufficiently promising to give encouragement to the planters, and it is anticipated that cotton will be planted somewhat extensively during the next planting season especially in the northern district of the colony.

Vanillin.

We publish on p. 103 of this issue an interesting article by Dr. Wyndham R. Dunstan, F.R.S., Director of the Imperial Institute, on artificial vanillin.

Vanillin is the essential constituent of vanilla, and so its artificial production must be of interest to agriculturists in the West Indies. Up to the present artificial vanillin has been prepared mainly from eugenol, the active principle of oil of cloves, but more recently a process of preparing it from sugar has been patented. One remarkable feature of the question, as Dr. Dunstan points out, is the slight influence the production of artificial vanillin has had upon the price of the natural vanilla.

Cassava Starch in Jamaica.

Reference has already been made in the *Agricultural News* (Vol. III, p. 44) to attempts that are being made in Jamaica to work up an export business in cassava starch. In an article on 'Jamaica cassava' in the *Bulletin of the Department of Agriculture, Jamaica*, Mr. Cousins refers to Mr. Middleton's efforts in this direction and states :—

> The demand for cassava starch of high quality for dressing Manchester goods has recently been impressed upon us by the visit of a prominent representative of the industry in Manchester. If Jamaica can produce a high quality cassava starch, free from fibre, grit and dirt and also free from the organic acids of fermentation which readily arise when cassava tubers are allowed to stand or the manufacture is carried out in a dilatory and imperfect manner, there is an assured market for all we can produce, and at a remunerative price.

Manjak from Trinidad.

A sample of manjak, obtained from a deposit of natural pitch recently discovered in Trinidad, has been examined in the Scientific and Technical Department of the Imperial Institute, and a report upon this examination is published in the last issue of the *Bulletin of the Imperial Institute* (Vol. I, pp. 180-2).

It is pointed out that the use of such a material as this for coating iron to prevent rusting, for the preparation of black varnishes and for other purposes depends upon the bitumen in the material having a low melting point. Trinidad manjak, the bitumen of which has a melting point of 428° F., compares very unfavourably in this respect with similar products already known in commerce, such as Venezuelan pitch (melting point of bitumen, 150° F.) and Trinidad asphalt (melting point of bitumen, 192° F.). Trinidad manjak was reported to be unsuitable for varnish making since it could not be thoroughly melted in large quantities, and was found by asphalt dealers interested in its use as an insulating material to be difficult to work.

It is suggested that these difficulties, which are due to its deficiency in liquid bituminous matter, might be met by the incorporation of what is known as 'petroleum residuum,' and in this connexion it is pointed out that a suitable 'residuum' could probably be obtained from the crude petroleum now being worked in the island.

Mahogany in England.

In a paper on 'Mahogany and other fancy woods available for constructive and decorative purposes,' read by Mr. Frank Tiffany before the Society of Arts, an interesting account is given of the chief sources of mahogany as well as notes upon the quality of the different varieties of this wood shipped to the United Kingdom.

Generally speaking, 'Spanish' mahogany, that is, wood from St. Domingo and Cuba, possesses the finest texture and has, in a marked degree, those chemical constituents which cause the wood to mellow and improve in colour with age, giving it a charm which is distinctively its own. The supply from St. Domingo is now insignificant; the Cuban shipments afford a good range of sizes fitting them for constructive and decorative purposes.

The next wood in order of merit is Honduras 'bay wood,' especially that from Belize and Trujillo. This wood is shipped in larger sizes than Spanish wood and is therefore adapted to larger work. Mahogany is also shipped from Nicaragua, Panama, Guatemala, Costa Rica and Colombia. The quantities of wood shipped from these Central American countries are diminishing.

There has, however, been a considerable development in the African mahogany business, the principal woods being from Lagos, Benin, Axim and Bathurst. It is stated that African wood forms a desirable addition to the imports of mahogany, and, if properly selected, will hold its own.

Crops in Cuba.

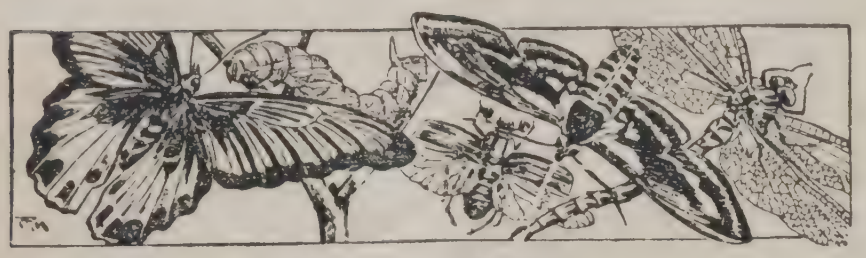
The *Journal d'Agriculture Tropicale* for February 1904 reproduces from a Havana paper, an interview with Mr. A. E. Frye, a former Inspector of Schools in Cuba, on the cultivation of oranges in that island.

Mr. Frye recommends the planting of the famous 'Navel' variety of oranges, but warns intending planters against unscrupulous nurserymen, advising them to buy only guaranteed plants from well-known firms of orange growers. The best plants cost in California $1·00 a piece: these would yield fruit in five years. To plant 10 acres would thus cost $1,000 exclusive of transport.

In Cuba there is not the intense dry heat which obtains during the summer in California, but, on the other hand, there are no frosts, while the soil is good. In California, also, destructive insects and fungi are abundant, especially near the frontier of Mexico, but by combined action their ravages have been much reduced.

The carriage by rail from California to New York amounts to 90c. per case, by sea from Havana to New York only 20c. The customs dues amounted previously to 70c., but under the Cuban Reciprocity Treaty they are reduced to 56c., giving the Cuban oranges an advantage per case of 14c. over those from California.

Captain John A. Floyd, proprietor of San Marco estate, has this year reaped cotton from 91 hectares (about 225 acres) and is so satisfied with his results that he intends planting 650 hectares (about 1,625 acres) in June and July of this year. The sugar and tobacco harvests have both enormously increased.



INSECT NOTES.

Lady-birds.

There have recently appeared in the *Agricultural News* two articles on lady-birds, and mention of them in a general way has frequently been made at other times. As used here the name 'lady-bird' refers in every instance to the members of a family of beneficial insects, but some persons seem to regard lady-birds as injurious insects. Reference to a paper by the Rev. N. B. Watson, published in the *West Indian Bulletin* (Vol. IV, p. 37), shows that the lady-bird familiar in the West Indies to the children in connexion with the classic rhyme is the lady-bird or root-borer of the sugar-cane. This is, perhaps, the only section of the world where English speaking people use this name for any but beneficial insects. In England, Australia, the United States, Canada, South Africa and New Zealand, the lady-birds are always beneficial insects.

The following brief description of the lady-birds in general will serve to indicate their relation to insects as a whole and make it possible for any one who will take a little interest in the matter to recognize them.

The beetles (*Coleoptera*) are insects with biting mouth parts, two pairs of wings, the outer or anterior of which are hard, horny sheaths, covering the abdomen. The posterior wings, which are used for flight, are large, thin, membranous, and, when the insect is at rest, are folded under the wing covers, or *elytra* as the anterior pair is called.

The metamorphosis is complete: that is, there are four distinct stages in the life of the individual—the egg, the larva or grub, the pupa or transforming stage, and the imago or adult. The larvae of the beetles have biting mouth parts.

The lady-birds form a group of *Coleoptera* with similar structure and habits and have received the family name *Coccinellidae*. These are small beetles, the species so far known in the West Indies not exceeding $\frac{1}{4}$ inch in length. The colour is generally black with red or yellow spots, or red or yellow with black or white spots or markings. In shape they vary from very hemispherical to oval. The larvae are spiny, dark, with yellow or orange spots, rather long, and tapering to a point behind. Both the larvae and adults are to be found on plants infested with plant lice and scale insects, on which they feed.

The lady-bird borer of the sugar-cane also belongs to the *Coleoptera*, but is one of the *Rhyncophora* or snout beetles. The snout beetles have the front of the head prolonged to form a sort of snout or beak. The body is not hemispherical, as in the lady-birds, but more cylindrical; the legs are large and strong, and so far as is known, they are all plant feeders. The weevil borer of the sugar-cane (*Sphenophorus sericeus*), the banana weevil (*Sphenophorus sordidus*), the grain weevil (*Calandra granaria*) all belong to the *Rhyncophora* and will serve as good examples of the nature of the whole of the *Rhyncophora*.

These notes, describing the chief characters of the *Coccinellidae* and of the *Rhyncophora*, should be sufficient to enable our readers to determine whether any insect is a lady-bird or not, and consequently, whether it is beneficial or likely to be injurious.

Parasitic and Predaceous Insects.

In the *Hawaiian Forester and Agriculturist* (Vol. 1, No. 1) there is an article entitled 'The value of beneficial parasites as compared with chemical insecticides,' by Dr. W. B. Wall, of California. The writer mentions lady-birds predaceous on scale insects, especially the good work of the Australian lady-bird (*Vedalia cardinalis*) in practically freeing the citrus groves of California of the cottony cushion scale.

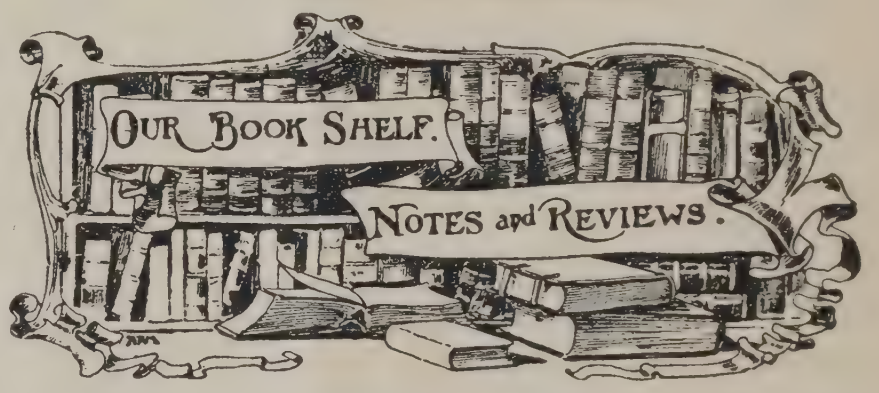
He also mentions the recently imported Chinese lady-bird which feeds on the San José Scale. One lady-bird larva has been known to eat 1,500 scale insects in a day.

Mr. Wall estimates that there are over 1,000 species of lady-birds known in the world at the present time, and believes that when they are properly known and managed there will be no need for spraying or fumigating fruit trees and orchards.

The real parasites, as distinguished from the predaceous forms, are also believed to be of great value and several species are known which attack the various scale insects.

These are mostly small, four-winged flies, which live within the body of the scale insect and completely kill it. Several orchards, formerly badly attacked by scales, are now quite clean, although not sprayed or fumigated.

The relation of parasites and host has been discussed in the *Agricultural News* (Vol. II, p. 362).



JORNAL DOS AGRICULTORES: Edited by Antonio De Medeiros. *Rio de Janeiro, Brazil.*

This is a monthly publication devoted to the agricultural interests of Brazil. It contains interesting articles relating to the various branches of agriculture and horticulture. Among the crops to which prominence is given may be mentioned coffee, cacao, rubber, etc. In the issue for February we notice an interesting article on the cultivation of Sulia (*Hedysarum coronarium*). This is a leguminous plant grown as a food for stock.

HAWAIIAN FORESTER AND AGRICULTURIST: A monthly magazine devoted to forestry, entomology and agriculture. Edited under the direction of the Board of Commissioners of Agriculture and Forestry. *Honolulu, 'Hawaiian Gazette' Co., Ltd., 1904.*

We are in receipt of Nos. I and II of the first volume of this new publication. In the editorial announcement it is explained that there has been no journal devoted specifically to the minor agricultural and forestry interests of the Territory, that the Hawaiian *Planters' Monthly* is devoted exclusively to the sugar industry, and that it is considered that a special publication is therefore warranted. The two numbers already published are full of interesting information on various agricultural topics. We notice that attention is being devoted to the question of cotton growing, and information relating to its cultivation in the West Indies is extracted from the publications of the Imperial Department of Agriculture.

AGRICULTURAL SHOWS.

Montserrat.

As briefly stated in the last issue of the *Agricultural News*, the fourth show under the auspices of the Imperial Department of Agriculture was held at the Market on February 25. The following Report has been forwarded by the Honorary Secretary :—

The number of exhibits was 320 against 585 of the previous year. The falling off is due to fancy work being excluded owing to want of funds. The exhibits, however, though fewer, were of better quality than was the case in the previous show. Class II, cacao, was well represented, as also Class VI, prepared meals. There were many exhibits of fine onions and cotton lint. Stock was better represented than at the last show. The following were exhibited by the Imperial Department of Agriculture :—A crate of Chinese banana (Creole fig) packed in Barbados for shipment to London, which created much interest, the cost of package, etc., being given ; two hutches with Belgian hares ; named varieties of yams, eddoes and tannias ; bee-keepers' supplies, honey in various packages. The tools loaned by the Imperial Department of Agriculture were again shown and their uses explained to visitors. A supply of bee literature was distributed ; a woman was employed on the show grounds to scrape ginger, and youths were putting together the parts of beehives throughout the day. The prizes were distributed by the Commissioner and Mrs. Watkins. Sir Daniel Morris, in presenting the Diplomas of merit, congratulated the inhabitants on the success of the show, touched on the cotton and onion industries and encouraged those present to devote their energies to the cultivation of the soil. The Diplomas were as follows :—

Mrs. Watkins, collection of jams and jellies ; James Williams, bay oil ; C. Watson, sample and bale of cotton ; A. Dyer, collection of cacao, honey and bananas ; St. Mary's School, exhibit of produce from school garden ; C. S. Meade, horse ; and George Boston, cow.

St. Vincent.

A very successful Agricultural Show was held at St. Vincent on March 10, under the auspices of the Imperial Department of Agriculture, the arrangements made by the local committee being satisfactorily carried out.

Among a large variety of exhibits, which were, on the whole, of excellent quality, the vegetables occupied a prominent place. In this class there were twenty kinds of vegetables exhibited and twenty-four prizes were awarded. A pupil of the Agricultural School, E. Haynes, was specially congratulated for his exhibit.

Cotton was well represented at the show, the prizes being obtained by Mr. J. W. G. Hazell. There was also a good show of live-stock (horses, cattle, goats, sheep, pigs, rabbits and poultry).

As at the shows held in the other islands during the last few weeks, an attractive feature of the show was the exhibition by children of the elementary schools of growing plants in pots. A first class Diploma was awarded to the Kingstown Wesleyan School, which secured four prizes.

After the distribution of the prizes, his Honour E. J. Cameron, in a short speech, congratulated the prize winners and spoke of the benefits of such shows in promoting the advancement of agriculture. The Imperial Commissioner of Agriculture then distributed the Diplomas of Merit as follows :—

The Hon. C. J. Simmons, carriage and saddle pony ; the Hon. and Revd. J. H. Darrell, section of comb honey ; J. G. W. Hazell, Sea Island cotton ; E. Haynes, tomatos and school garden ; J. dePassos, wax ; W. C. Hutchinson, native sheep ; W. Jackson, native spices ; P. E. Huggins, vanilla pods.

Sir Daniel Morris heartily congratulated the committee in charge of the arrangements upon the satisfactory result of their labours, and stated that such shows could not fail to prove of great educational value and to advance the interests of all classes of the community. Neither of the staple industries, sugar and arrowroot, at current prices could be depended upon to maintain the population, and it was therefore necessary for the people to turn their attention to other industries, such as cacao, cotton, spices, etc. The Imperial Department of Agriculture had for nearly six years been actively engaged in affording assistance in regard to those industries, and he rejoiced that the efforts of the Department were being so generally appreciated.

JAMAICA : REPORT ON THE DEPARTMENT OF PUBLIC GARDENS AND PLANTATIONS AND BOARD OF AGRICULTURE, 1902-3.

In the report of the Director of Public Gardens and Plantations an account is given of the work that has been carried on in the various gardens, as well as of the general work of the Department, including the distribution of plants, etc.

The report of the Board of Agriculture deals with (1) the work of the Board, (2) Agricultural experiment work, and (3) Agricultural educational work.

'The Board directed the experiments in progress at the Hope Experiment Station, and the local agricultural experiments. It considered and advised on the educational work in agriculture for students at the government laboratory, and for elementary school teachers, training college students, apprentices and industrial school boys at Hope Gardens.' Various other matters were dealt with, such as the sugar industry, prison farm, proposals for a stock farm.

The agricultural experiment work at Hope consisted in experiments with new varieties of different crops, the budding and grafting of plants for distribution, cross-fertilization of pine-apples, sugar-cane experiments, tobacco growing, cotton growing, etc.

Local manurial experiments were carried out by the Chemist with pine-apples, sugar-cane, bananas and coffee on estates in different parts of the island. Reference has already been made to these in the *Agricultural News* (Vol. II, p. 372).

The educational work of the Board is dealt with under the following heads :— (*a*) Lecturer of the Imperial Department of Agriculture, (*b*) Elementary schools, (*c*) Training at Hope Experiment Station, (*d*) Travelling Instructors, (*e*) Training of Agricultural Students at Hope.

It is apparent that a large amount of useful work is being accomplished by the Board of Agriculture in its various branches, which should have a considerable effect upon the agricultural industries of the colony.

GLEANINGS.

A Conference of banana growers at Barbados is proposed to be held at the Planter's Hall, Bridgetown, on Thursday next, March 31, at 2.30 p.m.

The present sugar crop at Barbados is expected to be a good one. It is hoped that it may reach a total of 60,000 hhds., as compared with 35,000 hhds. last year. The molasses crop will also be a correspondingly large one.

The Hon. Francis Watts writes that fire-flies have been seen in Antigua upon several occasions during the past few months, which would suggest that these insects have recently been introduced into the island.

Indian Planting and Gardening of January 23, has a reference to the invention of a cotton-picking machine. It is claimed for it that it can pick seven bales a day on an average where the yield is as much as a bale per acre.

Lectures in Agriculture to teachers in charge of Elementary Schools at Antigua are proposed to be given by Mr. A. H. Kirby, B.A., on the first Saturday in each month. The first of the new series for 1904 was given on March 5 last.

The Hon. Francis Watts writes : ' Dr. Gabriel says that if cotton seed is slightly parched it can readily be crushed in an ordinary corn crusher. Some of our planters are successfully crushing it in the " Little Giant " corn and cob crushers recently imported.'

In his opening speech to the Legislative Council of Jamaica, his Excellency Sir Augustus Hemming, G.C.M.G., gave the following estimate of the decrease in the exports of bananas and cocoa-nuts as the result of the hurricane :— bananas (without allowing for any increase in 1903-4), 7,142,000 bunches ; cocoa-nuts, 11,289,000.

Mr. G. S. Hudson, Agricultural Instructor at St. Lucia, writes : 'When visiting the Rivière Doreé School Garden, I was much struck by a new method of growing turnips, viz., by cutting off the edible root and replanting the old heads and leaves, as with tannias, when a new turnip is formed.' We might mention that similar results with radishes have been reported from a school garden in Castries.

An interesting exhibit at the Agricultural Show recently held at St. Vincent was the shell of a calabash fruit converted into a terrestral globe for teaching purposes. This was the work of an old teacher who had drawn the lines of latitude and longitude with great care and given an excellent outline of the continents. The idea is a happy one, and we commend it for general adoption in West Indian schools.

The *Port-of-Spain Gazette* of February 27, 1904, has a note in reference to the manufacture of buttons from the fruits of a palm. The palm referred to is the Ivory nut palm (*Phytelephas macrocarpa*) ; its seeds become quite hard, like ivory, when ripe, and the material is known as Vegetable Ivory.

An Act (1904, No. 6) has just been passed by the Legislature at Barbados offering a reward of 3*d.* per head to encourage the destruction of the mungoose. It also provides that any person who shall import, or attempt to land, a mungoose, or head of a mungoose, shall be liable to a penalty not exceeding £5 in each case.

The United States Consul General at Coburg, Germany, reports : 'Mr. E. Callemberg, of Lank-on-Rhine, has succeeded in preparing, on a commercial basis, pure chlorhydrate of terebinth, commonly known as "artificial camphor," and has found that this pure body has many valuable properties.' (*U.S. Consular Reports.*)

The recently formed Agricultural Society at Nevis appears to be in a vigorous condition. It has lately received addresses from the Governor, Sir Gerald Strickland, K.C.M.G., the Hon. Francis Watts and Sir Daniel Morris, K.C.M.G., all relating to the cotton industry which is being taken up actively by all classes of the community. The President of the Society is the Hon. C. Arthur Shand, the Resident Magistrate.

The services of the pedigree Hereford bull, obtained by the Imperial Department of Agriculture for St. Vincent in 1902, have proved of great value to stock keepers in that island. At the recent Agricultural Show held at Kingstown several handsome calves were exhibited, many showing the best characteristics of the Hereford breed. This breed is one of the most suitable for producing beef cattle, which are in great demand in the other islands.

Mr. G. S. Hudson, Agricultural Instructor at St. Lucia, reports that considerable losses are being experienced on some cacao estates from the 'Brown Rot.' Of one outbreak Mr. Hudson writes : 'I am afraid that the high elevation (1,000 feet) and consequent low temperature and humidity are responsible. I have known the thermometer at 55°F. on a cold morning in this locality, and 70° may be taken as an average early morning reading.'

The total annual production of coffee amounts to more than 21,500,000 bags, of an average weight of 134 lb. each, or 2,881,000,000 lb. This production represents a total value of more than $255,000,000 annually contributed by the coffee industry to the world's trade and commerce. Such a grand total is realized by the annual net product of more than 1,800,000,000 coffee trees in full bearing. (*U.S. Consular Report.*)

A general meeting of the Dominica Agricultural Society was held at the Court House, Roseau, on February 26. Over thirty members attended. The Secretary and Treasurer read their reports for the year 1903, and the office bearers for the year were elected. Out of three candidates, Dr. Nicholls was elected Vice-President, the other officers being re-elected. There was a discussion upon a scheme for a Produce Association with a view to regulating the green lime trade, and a committee was appointed to consider the matter in detail.

ITALIAN CHESTNUTS AND CHESTNUT TREES.

The following short report on the cultivation of chestnuts by the United States Consul at Turin, Italy, is taken from the *Monthly Consular Reports of the United States Department of Commerce and Labour* for February 1904 :—

The chestnuts exported from Turin to the United States during the year ended June 30, 1903, were valued at $12,762. The crop this year, I am informed, while not large, will be excellent.

Chestnuts form an important article of food in Italy. They are large and four or five times the size of the chestnuts grown in the United States. This, I think, is mostly the result of cultivation. They are numerous in variety and flavour, and I have often wondered why they have not been introduced and grown in some sections of the United States.

In Italy the peasant takes great care of his chestnut grove, more than some Americans do of their apple orchards. Old and barren trees are removed and in their places young ones are planted. The young trees, when of sufficient growth, are carefully budded. The following is the manner and system of budding :—

In the spring, when the sap is fully matured and flowing freely, the cultivator climbs the tree he wishes to reproduce, selects a young and tender limb, say, about ¾ inch in diameter, cuts off the end of the branch, turns the bark down a little, then with his finger and thumb, by gentle twists, loosens the bark the entire length of the branch, circles the branch about ½ inch either way from the bud, pulls off the rings, puts them in a pocket which he carries before him—same as carpenters carry nails—and, when he proceeds to the young trees, cuts off the ends of limbs or branches that he wishes to bud, pulls down the bark to the desired place and then just as a ring is put on the finger, he puts one of the rings on the end of that branch. This he does snugly, for it must not be too tight or too loose, but fit so that the sap from below will communicate with and circulate under it. The bud on the ring will then grow and in due time reward the intelligent operator with the same kind of chestnuts borne by the trees from which he took the buds. In this manner I have seen wild, worthless trees budded and made to bear excellent fruit. The same process is practised in the production of elastic willow twigs, for in these grape-growing regions willow twigs are much used in tying the grape vines to trees or frames.

As the chestnut tree is not native to Italy or to any other country in Europe, being an importation, there is no reason why the tree cannot be imported into the United States and thrive equally well.

Pearl Fishery. A correspondent writes : 'It appears that a successful pearl fishery industry is being carried on at Margarita Island off the coast of Venezuela by an English company known as "The Pearl Fisheries Limited," whose address is 19, Swithin's Lane, London, E.C. I am of opinion that it might be possible to transfer some of the pearl oysters from Margarita and eventually establish a pearl fishery at Antigua or elsewhere in the neighbourhood of the British islands. The subject is worthy of consideration and it is desirable that some action be taken in that direction. As a first step it would be necessary to arrange for the oysters to be carefully taken up by the company at Margarita and conveyed under suitable conditions to the locality where it is proposed to establish them.'

THE YAM BEAN.

Roots of this plant (*Pachyrhizus tuberosus*), exhibited at the Dominica Agricultural Show, were recently forwarded by Mr. J. Jones, the Curator of the Botanic Station, to the Imperial Department of Agriculture. Mr. Jones writes that in Dominica the plant is known as the 'Tapioca plant.' This name, which is also employed in Jamaica for the Tous-les-mois (*Canna edulis*), is very misleading, since tapioca is the product of the cassava plant. It is also stated by Mr. Jones that the plant is said to have been brought to Dominica from Cayenne.

The Yam bean is not particularly common in the West Indies, although plants are to be found in cultivation in several of the islands.

The following description of the plant and its uses is taken from Macfayden's *Flora of Jamaica* (p. 286) :—

'Flowers white. Seeds red. The root is formed of a number of simple cord-like fibres, stretching under the surface of the ground, bearing in their course a succession of tubers.

'The beans are poisonous ; but the root affords a very plentiful supply of a very wholesome food. The produce of these plants is usually sufficient to fill a bushel basket. The tubers may be either boiled plain, in which state they are a very good substitute for yams or other roots in common use; or they may be submitted to a process similar to arrowroot, and a starch obtained. This starch is of a pure white, and is equal in every respect to arrowroot. To the taste it is very palatable for custards or puddings. Even the trash left after obtaining the starch, and which, in the preparation of arrowroot, is lost, may, when thoroughly dried, be formed into a palatable and wholesome flour. A very excellent flour may also be obtained by slicing the tubers, drying them in the sun, and then reducing to a powder.

'This plant is deserving of being more generally cultivated than it has hitherto been. It ought in a great measure to supersede the arrowroot in cultivation. It can be planted at any season of the year and the roots are fit for digging in the course of four or five months ; the return is infinitely greater than that from arrowroot, and the proportion of starch also is more abundant, so that it can be brought to market at so cheap a rate as to admit of being employed by calico printers in place of potato starch.'

In an article on this plant in the *Kew Bulletin* (1889, p. 17) reference is made to the use of the young pods as a vegetable, served like French beans, to which, however, they are superior owing to the absence of any fibrous strings. Although the mature beans are poisonous the young beans can safely be eaten when cooked. It is stated in the *Bulletin of the Botanical Department, Jamaica*, (No. 44, p. 4) that from one seed sown at Hope Gardens five yams were dug, weighing altogether 14 lb.

DEPARTMENT NEWS.

Dr. Longfield Smith, Lecturer in Agricultural Science at Harrison College in connexion with the Imperial Department of Agriculture, will proceed to Bermuda to deliver a course of ten lectures on agricultural subjects to the teachers in elementary schools and others in that colony. It is probable that Dr. Longfield Smith will embark S. S. 'Ocamo' on April 5 next and return in time for the re-opening of Harrison College early in May.

NOTES ON NITRIFICATION.

Mr. H. H. Cousins, M.A., F.C.S., writes in the *Bulletin of the Jamaica Department of Agriculture* for January on the subject of nitrification. We reprint the following notes relating to the conditions affecting the nitrification of ammonia :—

PRESENCE OF ORGANISMS.

Fortunately for the agriculturist, the bacteria responsible for nitrification are *universally distributed* and no practical cultivator runs risk of loss through the actual absence of nitrifying organisms. Cultivated soils from all sources, desert sand and rocky fragments from lofty mountain tops, have all yielded proof of the presence of nitrifying bacteria. Warington found that all the samples taken from the cultivated surface of the soil which he tested contained nitrifying organisms. At a depth of 2 feet, powers of nitrification were occasionally lacking, while at a depth of 6 feet and over the soil had lost all such powers. Nitrifying organisms, therefore, are mainly present in *the upper tilled surface* of the soil and do not exist in the lower depths of unstirred soil. Such a distribution is obviously due to the fact that conditions favourable for nitrification are alone possible in the upper surface of the soil.

AIR.

The atmosphere contains one-fifth of its volume of oxygen gas and as this latter material is requisite for the purpose of oxidizing ammonia, a full supply of air is necessary for the free progress of the change. Drainage, cultivation with plough and harrow, spade, fork and hoe are time-honoured tributes to this fundamental requirement of cultivated ground. A water-logged soil, in which the pores are saturated with water, is an impossible medium for nitrification owing to the absence of air. The wonderful improvements that have been brought about in the case of stiff, impervious soils, by drainage and good cultivation are closely associated with the improved aëration of the soil and the consequent promotion of nitrification.

PRESENCE OF SALIFIABLE BASE.

It is desirable that special emphasis be laid on the absolute necessity of such an alkaline carbonate as chalk for the general requirements of the progress of nitrification. Those traditions of good cultivation which have been evolved through centuries of experience and observation by generations of practical men, have received marked confirmation and a rational explanation through the latest discoveries as to the causes and conditions of nitrification. The recommendations of science, based upon a comprehension of the causes at work, are singularly in harmony with the general maxims of good cultivation, based upon a shrewd appreciation of obvious effects. Of all the conditions favouring nitrification, lime or chalk is the one that is most frequently lacking in practice and that merits the careful consideration of every agriculturist who seeks to obtain the best returns from the cultivation and manuring of his land. Chalk is rapidly washed out of cultivated soil through the action of water and carbonic acid, and moreover, it is an essential for the working of sulphate of ammonia at two stages of its history in the soil.

MOISTURE.

When soil is dust-dry, nitrification ceases. Schloesing found, for instance, that provided the soil was not water logged and free aëration was secured, the rate of nitrification increased with the proportion of moisture in the soil.

From the point of view of practice, nitrification is thus seen to have a close connexion with the accidental variations of season, other conditions being the same. A season of intermittent and fairly liberal rainfall is most favourable for nitrification. Excessive wetness, however, depresses this activity by reducing the temperature of the soil and overloading it with moisture. It is important to note that cultivation is of great service in promoting and maintaining the progress of nitrification during a trying time of drought. The addition of dung and bulky organic manures greatly promotes the water-holding properties of a soil, and the constant preservation of a loose surface tilth by the use of cultural implements prevents the free escape of soil-moisture into the air. It is clear that, after all, the water supply is a most crucial factor in the development of our crops, for not only does this limit the direct feeding capacity of the plant but also the rate of production of nutritive nitrates from the humus of the soil and such manures as sulphate of ammonia.

TEMPERATURE.

The most favourable temperature for nitrification is about 100°F., at which temperature Schloesing found it to be ten times as active as at 57°F. In hard frost the action entirely ceases, but, as Warington suggests, in an average English winter the change is generally going on to a small extent. In tropical climates which combine abundance of moisture with a brisk heat, great intensity of nitrification is assured and this is one of the explanations of the remarkable luxuriance of tropical vegetation.

CULTIVATION.

Although nitrifying organisms are apparently ubiquitous, their rate of reproduction is relatively slow. A reclaimed soil which has been hitherto unproductive generally requires one or two seasons to develop normal intensity of nitrifying power. From the peculiar natural properties of the nitrobacter organisms, it would appear that constant stirring and turning of the soil should promote their uniform distribution and rapid increase in the soil, and experiments by Schloesing as to the rate of nitrification in soil under various conditions of cultivation favour this idea.

POTASH AND PHOSPHATES.

Both types of nitrifying bacteria require a general mixed diet of mineral food, besides the carbonic acid gas and ammonia which form their staple nourishment. Of these minerals, potash and phosphates are of the chief importance. It is thus evident that a well nourished soil not only feeds a crop directly, but by promoting nitrification of ammonia exercises a very important secondary action.

Conclusions.

(1) Sulphate of ammonia when applied to fertile soil gives up its acid to the chalk with which it comes in contact.

(2) The ammonia is then absorbed by the soil and prevented from loss by drainage owing to the guardianship of humus and clay.

(3) Ammonia is converted first into nitrite and finally into nitrate of lime by two distinct types of bacteria.

(4) The general conditions of soil-fertility are closely connected with those of nitrification ; good cultivation promotes efficient nitrification.

(5) The rate of nitrification of ammonia corresponds with the requirements of plants, and during the growing season this change takes place quite as fast as is good for the plant.

MARKET REPORTS.

London,—March 1, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', February 26, 1904; and 'The Public Ledger,' February 27, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/6 to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per ℔.
Balata—1/6 to 2/- per ℔.
Bees'-wax—£7 2*s.* 6*d.* to £7 5*s.* per cwt.
Cacao—Trinidad, 58/- to 66/6 per cwt.; Grenada, 52/6 to 64/6 per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 61/6 per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per ℔.
Coffee—Jamaica, ordinary, 38/6 to 75/- per cwt.
Copra—Trinidad, £17 to £17 5*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/2½ to 1/3½ per ℔.
Divi Divi—No quotations.
Fruit—
Bananas—Jamaica, 5/- to 7/- per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 35/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/4 to 2/11; Cake, 1/1 to 1/2 per ℔.
Kola Nuts—4*d.* to 7*d.* per ℔.
Lime Juice—Raw, 9*d.* to 1*s.* 2*d.* per gallon; Concentrated, £12 to £12 10*s.* per cask of 108 gallons.
Lime Oil—No quotations.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/9 to 2/3 per ℔.
Nitrate of Soda—Agricultural, £9 15*s.* per ton.
Nutmegs—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per ℔.
Pimento—3¾*d.* to 4*d.* per ℔.
Rum—Demerara, 9*d.* to 10½*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 1/1 per ℔.
Sugar—Crystallized, 13/7½ to 16/3 per cwt.; Muscovado, Barbados, 15/6 per cwt.
Sulphate of Ammonia—£12 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

St. John, N.B.,—February 8, 1904.—'The Maritime Merchant.'

Molasses—Barbados, 29c. to 30c. per gallon; Porto Rico, 36c. to 40c.

Montreal,—February 11, 1904.—Mr. Alexander Wills.

Coffee—Jamaica, 10c. to 12c. per ℔.
Ginger—Jamaica, 8c. to 8¼c. per ℔.
Molasses—Barbados, 36¼c. to 39¼c. per gallon.
Molascuit—Demerara, $1·32 per 100 ℔.
Nutmegs—Grenadas, 110's 25c. to 26c. per ℔.
Pimento—Jamaica, 8c. to 8¼c. per ℔.
Sugar—Crystals, $2·00 per 100 ℔. in bond.
—Molasses $1·15 per 100 ℔. in bond.

New York,—March 4, 1904.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—Caracas, 13c. to 14c.; Jamaica, 10½c. to 12½c.; Grenada, 12⅝c. to 12⅞c.; Trinidad, 13c. to 13¾c. per ℔.
Cocoa-nuts—Trinidads, $22 to $24; Jamaicas, $26 to $28 per M., selected.
Coffee—Jamaica, fair to good ordinary, 6¾c. to 7½c. per ℔.
Ginger—Jamaica, 6½c. to 7c. per ℔.
Goat Skins—Jamaicas, 53c. per ℔.
Grape Fruit—No quotations.
Oranges—No quotations.
Pimento—7½c. per ℔.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3 13/32c.; Muscovados, 89°, 2 15/16c. to 2⅞c. per ℔.

INTER-COLONIAL MARKETS.

Antigua,—March 9, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—16c. per gallon (Imperial).

Barbados,—March 12, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 ℔.
Cacao—$13·17 to $13·75 per 100 ℔.
Cocoa-nuts—$10·27 per M. for unhusked nuts.
Coffee—Jamaica and ordinary Rio, $10·00 and $12·00 per 100 ℔. respectively.
Hay—$1·00 per 100 ℔.
Manures—Nitrate of soda, (none in stock); Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—14c. per gallon (puncheon included).
Onions—$4·00 per 100 ℔.
Potatos, English—$2·20 per 100 ℔.
Rice—Ballam, $5·25 per bag (190 ℔.); Patna, $3·60 per 100 ℔.
Sugar—in hhds., $1·45 per 100 ℔. (packages included).

British Guiana,—March 10, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·00 per barrel.
Balata—40c. to 42c. per ℔.
Cacao—Native, 13c. to 14c. per ℔.
Cassava Starch—$6·72 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 13c. to 15c. per ℔. (retail).
—Creole, 13c. per ℔.
Dhal—$3·80 to $3·90 per bag of 168 ℔.
Eddoes—$1·68 per barrel.
Molasses—Vacuum Pan yellow, 18c. per gallon, (casks included).
Onions—4c. per ℔., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per ℔. (retail).
Plantains—24c. to 72c. per bunch.
Potatos, English—$2·50 to $2·75 per barrel.
Rice—Ballam, $4·65 per 177 ℔., ex store; Creole, 18c. to 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·32 per barrel.
Tannias—$2·52 per bag.
Yams—White, $1·80 per bag.
Sugar—Dark Crystals, $1·85 to $1·88; Yellow, $2·30 to $2·40; White, $3·50; Molasses, $1·60 to $1·90 per 100 ℔.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·50 per M.

Trinidad,—March 10, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary, $12·75 to $13·00; Estates, $14·00 per fanega (110 ℔.).
Cocoa-nuts—$18·00 per M., f.o.b., selected in bags of 100, (husked).
Cocoa-nut Meal—1¼c. per ℔.
Cocoa-nut Oil—67c. per Imperial gallon (casks included).
Coffee—Venezuelan, $7·25 to $7·50 per 100 ℔.
Copra—$2·75 to $3·00 per 100 ℔.
Onions—$1·90 to $2·60 per 100 ℔.
Molasses—14½c. per gallon (without cask).
Potatos, English—$1·15 to $1·30 per 100 ℔.
Rice—Yellow, $4·35 to $4·50; White Table, $5·25 to $5·75 per bag.
Sugar—Yellow Crystals, $2·25 per 100 ℔.

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Pamphlet No. 29,—

'LECTURES ON DISEASES OF THE SUGAR-CANE.'

'WEST INDIAN BULLETIN' (Vol. IV, No. 4).

Containing report of Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 52. BARBADOS, APRIL 9, 1904. PRICE 1*d.*

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Barbados Fruit Trade.

IN the *Agricultural News* for January 30, the steps recently taken to encourage a Fruit Industry at Trinidad were discussed. In the present article it is proposed to afford information in regard to the fruit trade that is being gradually built up at Barbados in shipping bananas and mangos to the United Kingdom. The first shipments were made about a year ago. Since then, bananas have been regularly shipped by every Royal Mail Steamer, and the results in most instances have been very satisfactory. In some cases, the shippers have obtained on an average 3*s.* and 4*s.* per bunch after payment of all expenses. This is at the rate of £20 to £25 per acre.

The bananas grown at Barbados are similar to those produced in the Canary Islands. They are known as the Chinese or dwarf bananas: also as Governor and Cavendish bananas. The plants producing them are short in stature with stout stems and thus are capable of withstanding fairly strong winds. They produce large bunches with sometimes 200 to 250 'fingers' or single fruits in each bunch. The flavour is much liked in the English market. They are preferred to the Martinique or Gros Michel bananas exported from Jamaica. In May 1902, Messrs. Pink & Sons reported the Barbados banana was 'superior to that from the Canary Islands and Madeira.' In July 1902, Messrs. Geo. Munro & Co., of Covent Garden, stated: 'the Barbados bananas suit the London trade better than the coarser ones from Jamaica . . . . they stand the voyage well . . . are firmer and have apparently been grown in a drier climate than the Canary fruit.'

The Barbados bananas are always packed in crates. They are first wrapped in a sheet of cotton wool, then in paper, and last of all in dry banana trash, so that they are firmly held in the crates. By these

means, the fruit arrives at its destination in excellent order. The object is to supply the demand for a special fruit for which an enhanced price is willing to be paid.

At a conference of banana growers held at the Planter's Hall, Bridgetown, on March 31, the Imperial Commissioner of Agriculture stated that a sample crate of Barbados bananas shipped for exhibition to the Agricultural Show at Montserrat was afterwards re-shipped to Antigua. At the end of twenty-three days the Hon. Francis Watts, who had retained the crate in the Government Laboratory, reported that the fruit had ripened of a delicate yellow colour with an excellent flavour.

There is no reason why planters in Barbados, who possess suitable soil for growing bananas and who carefully comply with the conditions necessary for shipping them in first-class order, should not establish a thoroughly successful fruit trade with the United Kingdom. With the exception of Trinidad, Barbados is 1,000 miles nearer England than any banana-growing country in the Western Hemisphere and is therefore more favourably situated than other parts of the West Indies for supplying the British market.

The advantage of the crate system is that cold storage is not required. All that is necessary is to provide adequate ventilation, at the ordinary temperature, by means of fans; and to ensure that requisite precautions are taken on arrival in England to prevent the fruit from being chilled in exceptionally cold weather.

At the Banana Conference above referred to, attention was drawn to the exceptional position occupied by Barbados in regard to a trade in bananas with the United Kingdom. If this were realized, as it is hoped it would be, within the next year or two banana planting would become more general and a remunerative industry would be established.

Already Barbados bananas had acquired a reputation in England. They were preferred even to the Canary bananas. There was likely to be no competition in crated fruit from any other locality in this part of the world; while the areas capable of growing bananas in the Canary Islands and Madeira were already fully utilized.

The advice given to those about to start banana planting was to select the best soil in sheltered situations and manure highly so as to produce large bunches. Usually it was not profitable to ship bunches with less than nine hands; and for every hand above nine a much higher price was given.

Full details as to cultivation, the selection of suckers, the distance apart, at which they were to be planted, the exact stage at which the fruit should be gathered and other matters were to be obtained in a valuable paper contributed by the Hon. William Fawcett, F.L.S., to the Agricultural Conference of 1902 (*West Indian Bulletin*, Vol. III, p. 153). Later information, relative to the same subjects, was contained in a report on a visit to Jamaica by Mr. W. E. Smith, recently published in the Proceedings of the Agricultural Society of Trinidad.

The cost of cultivation of bananas was placed at £10 per acre per annum. The gross receipts at £20 per acre. The net profit would thus be £10 per acre. This was recognized as an average return in Jamaica, but was exceeded in the Canary Islands. A net return of £10 per acre, it may be observed, was larger than for any other crop grown on a large scale in the West Indies.

In the matter of packing for export, the crate system was exactly suited to the circumstances of Barbados. This was the last port of call for the Royal Mail Steamers and the company had undertaken to provide accommodation for all the fruit likely to be grown in the island.

The cost of packing a bunch of bananas in a crate (with cotton wool, paper and dry trash) was from 1*s.* 4*d.* to 1*s.* 6*d.* each. The freight charged was from 1*s.* 6*d.* to 2*s.* 6*d.*, depending on the size. The best time for shipping bananas to England was during the months of March, April, May and June. It would be an advantage, therefore, to arrange the planting so as to obtain the largest yield of fruit during those months.

In conclusion, the conviction was expressed that if great care were taken to grow large bunches and the crate system were fully carried out, the banana industry of Barbados was likely to prove thoroughly remunerative.

Preservation of Meat. Meat is often preserved by salting or pickling and it is often thought that these processes destroy any bacteria that may have been present in the meat. This is, however, not the case; the salting merely prevents the germs from reproducing. For example, F. Peuch found that a ham made from an animal which had died of anthrax, still contained virulent anthrax bacilli after lying in salt water for fourteen days. Petri, again, showed that flesh from swine affected with swine erysipelas, still contained virulent erysipelas bacilli after six months' immersion in brine. It is therefore obvious that the greatest care should be taken not to pickle or salt any but perfectly sound meat.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

With the view of assisting in experiments with new seedling canes at Barbados, Professor d'Albuquerque has offered to undertake the analyses, free of charge, of samples of juice obtained from canes grown on one acre and upwards of new seedling varieties, provided information of the name of the variety, the area and weight of canes reaped or the number of gallons of juice obtained is forwarded for record.

Sugar-cane Experiments in India.

A Bulletin has recently been published by the Madras Agricultural Department giving an account of the experiments that are being conducted at the Sugar-cane station at Samalkot in the Godavari district. The following extracts from the Bulletin, which is written by Mr. C. A. Barber, M.A., F.L.S., are likely to be of interest :—

The growing of sugar-cane in the Godavari district, which was in former times so profitable an undertaking, has, during the last few years, suffered very considerably because of the disease which has attacked the canes.

This disease has received very careful attention by the Agricultural Department, and a special Government garden has been opened at Samalkot for its study and that of cane cultivation generally. The following remarks show what is being done in this garden.

The canes are being grown in all sorts of different ways. The objects of these experiments are :—

(1) to see if by any particular method of planting and cultivation the disease may be lessened and healthy canes may be grown, and

(2) to test the mode of planting sugar-cane in other countries, particularly the West Indies, so as to lessen the great expense to which the ryot is put in this country.

Another fact which must always be borne in mind is that plants as well as animals are like their parents, and if a diseased piece of seed is put in, the plant which grows from it will also be diseased. It is then very foolish for the ryot to leave for seed that part of his field which is too poor to make jaggery. And yet, this is very often done. All seed *with any red mark in it* must very carefully be separated and on no account planted. This is done every year at the Samalkot station.

So much for the growing of healthy canes ; now for the modes of cultivation in other countries. The ryot usually spends much money on sugar-cane cultivation. Some of this is wisely spent, but some of it is unprofitable. In the Godavari district he p ants a very great number of cane sets to the acre ; he spends much money in tying and wrapping his canes ; and, lastly, uses a vast number of bamboos to support them. Fewer seed are used in other countries ; no wrapping is done, and no bamboos are used. This is managed by planting the canes in a different manner—by deeper cultivation and by draining the land better. The plants are also put further apart and so become self-supporting bushes instead of long poles, like the bamboos to which they are tied. Experiments are being tried in this matter at Samalkot, where ryots can see for themselves what is being done.

There are, for instance, several plots which have been planted with only one-third the seed canes that are usual ; no wrapping has been done, and no bamboos are used. It will be interesting to see the results. Of course the cultivation of the ground is deeper, and the drainage is very carefully attended to. This will show that attempts are being made to grow canes cheaply, and the exact mode will be explained to any one who takes the trouble to come and look at the Government Garden.

Careful trials are being made at Samalkot to produce a better class of compost for the fields. For this purpose, pits are dug in the ground, 6 feet across each way and 4 feet deep. Into these pits are thrown all rubbish, sweepings, dead leaves, paddy husks, ashes, cattle manure and even fresh grass and bushes, until the pit is full. It is then covered over with earth and left until the time for ploughing. When it is opened, one of these pits is found to contain many cart loads of excellent manure.

EXPERIMENT WITH ENGLISH POTATOS.

An experiment has recently been conducted by the Hon. Dr. John Sealy at Hill View, Barbados, in the cultivation of English potatos. The following is a brief statement of the results :—

About 309 lb. of the Bliss Triumph variety were planted from November 4 to 13, 1903, on $\frac{1}{4}$ acre, at a distance of 5 feet by 1 foot. The tubers were dug from February 5 to 12, 1904. The total rainfall during the period between planting and reaping was 20·22 inches, which is about 5 inches above the average.

The total weight of potatos dug was 751 lb. and these, when disposed of, yielded $14·27. It is estimated that the cost of seed potatos and planting was $7·41, leaving a profit of $6·86 for the $\frac{1}{4}$ acre.

It is pointed out, however, that the distance between the plants was unnecessarily great: had the potatos been planted at a distance of, say, 3 feet by $1\frac{1}{4}$ feet, an additional yield of 350 lb. might have been expected, which would have materially increased the profit.

Dr. Sealy concludes from the beneficial effect of an abundant rainfall that it would be advisable to plant English potatos somewhat earlier than was done in this case, say, towards the end of September.

Condensed Eggs. The United States Consul General at Frankfort, Germany, reports : 'The commercial agent for Canada in Johannesburg states that South Africa is a good market for condensed eggs, as fresh eggs are from 3*s.* 6*d.* to 7*s.* 6*d.* per dozen. Condensed eggs are prepared from ordinary eggs by depriving them of their superfluous water and adding sugar. When being prepared for use, some water is added and the mixture quickly beaten ; it can then hardly be distinguished from fresh eggs. These condensed eggs are put up for the South African market in hermetically closed boxes, each containing from 1 lb. to several pounds. A 1-lb. box contains about fifteen eggs.' (*U. S. Consular Reports.*)

WEST INDIAN FRUIT.

FRUIT GROWING IN MEXICO.

The following notes on the fruit-growing industry are taken from the *Consular Report on Mexico* for 1902:—

The cultivation of fruits and vegetables, either for home consumption or even for export, has so far received very little attention from foreigners except perhaps in the State of Nuevo Leon, near Motemorelos, where large tracts are given up to the cultivation of oranges, which are readily exported across the border to the United States, where they find a ready market and are in as great favour as the oranges from Florida and California.

In the State of Vera Cruz there are a few foreigners who have tried the growing of fruits for preserving and for drying, with very fair results; and also in the State of Jalisco a factory has been established for the same object, and since the establishment of a large meat-packing house in the town of Uruapam, in the State of Michoacan, several new industries have been inaugurated in that State.

THE CULTIVATION OF PINE-APPLES IN THE MALAY STATES.

The *Agricultural Bulletin of the Straits and Federated Malay States* for January contains an article on pine-apple cultivation. Much of the information is taken from various West Indian publications, but the following extracts are of special interest as indicating the practice of pine-apple growers in the east:—

The soil used for pine-apple culture in Singapore is the ordinary stiff clay soil of the small hills which cover the island. Most of these hills have been previously used for pepper and gambier, and then abandoned, and often are covered with low secondary scrub which is burnt and the ground dug over before planting. The soil is usually very poor, especially in potash, phosphates and lime. Richer soil does not seem to suit the pine-apple better; but the plant does not appear to be very particular as to its habit so long as the soil is free and open, and not damp or low-lying.

The best plan is to plant pines in rows, $2\frac{1}{2}$ feet apart, with a 5-foot path between every three or four rows. In any case the plants should not be more than $2\frac{1}{2}$ to 3 feet apart.

The fields require careful weeding, but are not generally manured here. The first pines are produced from the suckers in from twelve to eighteen months. After the ripe fruit is removed, the suckers should be cut out leaving only two or three of the strongest. If all the suckers are left, they will produce fruits next crop, perhaps as many as a dozen, but the fruits will be small. If only one or two are left, the fruits will be much larger.

There are three crops in the year, November to December, February and March and the biggest in June and July, but the crops depend very much on the rainfall. When there is a spell of dry weather of long duration the pines do not fruit.

A properly cared-for estate, as cultivated in the Straits Settlements, lasts five or six years, but the pines gradually get smaller. If neglected it lasts but two or three years.

Manure is not commonly used in the Malay Peninsula on the large estates, but the Chinese occasionally apply a small quantity of cow dung, burnt earth, etc. For tinning pines, which require to be cheap, it would not be worth while to go to the expense of manuring.

THE WEST INDIES AND NATURAL HISTORY.

The St. Thomas *Tidende* of March 16 reviews a pamphlet by Dr. Mortensen and Mr F. Börgensen entitled: 'The Importance of the West Indies for Danish researches in Natural History.' The following extracts are of interest:—

The authors state: 'A beginning can, however, be made now, and that without any great expense; and it is just Denmark, which, through her famous naturalist, Otto Fr. Muller, has had the honour of making the first investigations into the animal life of the ocean bed, that ought also to have the honour of being the pioneer in the sphere of research in the deep ocean. For we have in our West Indian Colonies a place which is prepared by Nature herself for this purpose.' Finally, the authors conclude that Denmark, which has already an important biological station connected with her fisheries, needs a laboratory for the study of the animal and plant life of the ocean, and that the best place for such a station would be on the north side of St. Croix, near Christiansted.

Rainfall at Antigua. The returns of rainfall in Antigua for 1903 have been published by the Hon. Francis Watts in the *Leeward Islands Gazette* of March 10. The average monthly rainfall for 1903 (mean of 68 stations) was 43·68 inches. The average rainfall at Antigua for thirty years, from 1874 to 1903 (inclusive), was 46·33 inches, so that the rainfall for 1903 was 2·65 below the average.

COTTON.

Cotton Notes.

The Secretary of the British Cotton Growing Association writes :—

A fair quantity of cotton is now coming forward and we are anticipating more during the next few weeks. The best of it is realizing very satisfactory prices, viz., 16*d*., but for some reason or other a good deal of cotton is weak in staple. This is a matter which will require very careful attention, if West Indian cotton is to secure a name in the market.

Messrs. Wolstenholme & Holland, the well-known Cotton Brokers of Liverpool, write :—

It would be well that Sir Daniel Morris should be informed of the undesirability of planting Egyptian seed in the West Indies at present. It does not maintain the characteristics of the parent growth in the same degree that Sea Island seed does, and we are afraid of the deterioration of the latter through hybridization. Hybrids have sometimes been successes in Egypt and elsewhere, but as Sea Island is the finest description of cotton, it is not worth the risk, for a deterioration of quality quickly means the loss of pence per pound.

Selection of Cotton Seed.

Messrs. W. W. Gordon & Co. in their Sea Island Cotton Report, dated Savannah, Ga., February 12, 1904, publish the following warning with regard to the selection of cotton seed :—

Sea Island planters cannot be too careful in the seed they plant. In some sections, where cotton of excellent staple was produced a few years ago, neglect to replenish with fresh seed has resulted in cotton of weak and irregular staple, which has been almost unsaleable. Island seed will deteriorate after four years' planting on the main, and seed thus deteriorated cannot produce strong staple.

In view of the above facts, and the further fact that strong-staple Sea Island cotton is superior to any other kind of cotton and will always be saleable, whereas weak-staple Sea Islands are not so valuable and can be replaced by other cottons, the necessity for using the best seed must be apparent to every one.

Cotton at St. Vincent.

In reference to the notice that appeared in the last issue of the *Agricultural News*, relative to the purchase of cotton at the St. Vincent factory, we extract the following from the Rules and Regulations that have been drawn up for the factory :—

For carefully picked and dried Sea Island cotton, free from leaves, trash, etc., the charge for ginning and baling (and shipping, if desired) will be at the rate of 3c. per ℔. of lint. The seed will be returned to the grower provided he supplies bags for the purpose.

N.B.—The usual proportion of lint to seed-cotton is at the rate of 23 to 26 ℔. of lint to every 100 ℔. of seed-cotton. Unless the seed-cotton is very thoroughly dried and well picked, beforehand, there is usually a loss in ginning ranging from 2 to 5 ℔. per 100 ℔. of seed-cotton.

Small lots of Sea Island cotton, if clean and well picked, will be purchased at the factory at the rate of 4c. per ℔. of seed-cotton. In this case the seed will not be returned.

N.B.—The above price of 4c. per ℔. paid for Sea Island cotton is equivalent to payment at the rate of about 11*d*. per ℔. for the lint in the Liverpool market.

Disinfecting Cotton Seed.

With the view of preventing, as far as possible, the introduction of any cotton diseases with the selected seed to be distributed by the Imperial Department of Agriculture, it is proposed to have this seed carefully disinfected beforehand.

This disinfection will be carried on with a solution of corrosive sublimate in the proportion of 1 in 1000 : that is 1 ℔. of corrosive sublimate dissolved in 100 gallons of water.

It has already been ascertained that this solution will have no injurious effect upon the germination of the seed, while it is confidently believed that it will effectually dispose of any germs of disease that may be attached to the seed.

The following is a brief summary of the results of experiments carried on at the Mycological Laboratory of the Imperial Department of Agriculture in determining the effect of steeping selected cotton seed in corrosive sublimate *for one hour* and then sowing immediately :—

Strength of corrosive sublimate solution.	Time for which seeds were steeped.	Percentage of seeds germinated after 4 days.	Total percentage of seeds germinated (after 10 days).
Water	1 hour	73	84
1:1000	,,	58	89
1: 750	,,	77	88
1: 500	,,	60	83
1: 250	,,	46	84

It will be seen that steeping cotton seeds in solutions of corrosive sublimate up to a strength of 1 in 250 has no effect on the total number of seeds germinated. The 1 : 250 solution, however, appears to have a slight retarding influence on the speed of germination.

A second series of experiments has been started, carried out exactly as above. In this series, in addition, one set of seeds has been steeped in a 1 : 100 solution of corrosive sublimate.

A third series, to test the effect of steeping the seeds, drying them, and then planting them at different times after drying, has also been started.

Remedies for Scalds and Burns. A useful solution recommended for immediate application in the case of scalds and burns is sulphate of magnesia (common Epsom salts). A saturated solution of bicarbonate of soda, also, gives relief and is generally used as a first dressing. Directions for use are as follows : Keep cloths, well wetted with either of the solutions above mentioned, on the scald or burn, being careful not to remove the cloths but supply fresh solution to keep them always moist.

CASSAVA STARCH.

The following note on the manufacture of cassava starch appeared in the *Journal of the Jamaica Agricultural Society* for March 1904:—

The manufacture of starch from bitter cassava by machinery, which is being carried on at Longville, the property of Mr. J. W. Middleton, is being watched with interest. We have talked much of a great starch industry; this is the first systematic attempt to grow cassava largely, make starch and ship it in quantity to the United Kingdom to be tested. The details of the cultivation and manufacture show that starch can be produced here on terms as good as, and perhaps better than, in most other countries. It remains to be seen how the starch made stands the test in Lancashire for sizing cloth goods, against German potato starch and United States corn starch. As both the cultivation and the process of manufacture can be greatly improved from experience gained in the first shipment of the experiment, it should not be confidently expected that the starch must receive the highest commendation, nor should we, if it is not perfect, be discouraged. The German and the United States makers have available the most perfect of machinery, and the very best skill through long practice. If we make a morsel of a show against the potato and corn products at all, better equipped machinery and longer practice will soon put us ahead. The price of starch varies from £10 to £14 per ton. At the lower figure it would pay very well—better than sugar.

PROFITABLE RABBIT BREEDING.

The value of the rabbits imported into this country [United Kingdom] last year was over a million sterling—just about the same as the value of the foreign motor-cars we bought; but, whereas in the latter case there was a great to-do at our supineness in letting the foreigner benefit so largely in the trade, we accepted the million's worth of rabbits without demur.

The most profitable plan [for rearing rabbits] is the movable hutch, or Morant system—called after the inventor of it, Major Morant. This system requires grass land and a light, dry soil; the rabbits are kept in large hutches, movable, with wired floors, so that they can nibble the grass the hutch stands on.*

These hutches stand out in the field, and must be moved regularly twice a day. The rabbits graze in the grass, and thus get a portion of their keep. In wet weather they must, however, remain stationery, as wet grass upsets the rabbits. At such times they should have a little hay. These hutches do equally well for the rabbits when taken away from their mother, and the buck can inhabit a somewhat smaller one of the same pattern. He likes a shelf to sit on in his.

The management of the doe is very simple: Give her plenty of hay, and she will make her nest, lining it with her own fur. Some drinking water should be given her at this time, and a little bread-and-milk will be advantageous feeding. It is best not to meddle with the young. Dutch rabbits seldom mind, but other breeds do, and not infrequently desert them if disturbed. Dogs, cats and mice also violently upset them. The doe should have all the green food and hay she cares to eat when rearing her young, and if there is a shortage of the first, roots can take their place. (*County Gentleman.*)

* This plan is now being adopted with Belgian hares at the Agricultural School, St. Lucia. [Ed. *A.N.*]

FUNGOID DISEASES OF CACAO IN SURINAM.

Professor F. A. F. C. Went, whose name is well known in the West Indies in connexion with his work on sugar-cane diseases in Java, has recently published an account of the diseases on cacao in Surinam entitled *De Ziekteverschijnselen van de Cacao-plant in Surinam.* The work is mainly devoted to fungoid diseases, and especially to the 'Krullotenziekte' or 'Witch Broom disease,' which causes great damage in Surinam and to which attention has repeatedly been drawn in the *Agricultural News* (see Vol. II, p. 117).

Attention is drawn to the borer, *Steirastoma depressa*, which occurs in various estates in Surinam, to the parasol ants, and to a caterpillar which eats the young leaves.

Canker of the stem was observed on one plantation on the Surinam river. This is probably the same as that occurring in the British West Indies, reported from Trinidad, Grenada and Dominica. It is characterized by the exudation of a red, gummy mass from the bark, followed by a drying up. On cutting into the bark this is seen to have a wine-red colour, the underlying wood also taking on an abnormal colour. If a section of such diseased bark be examined microscopically, the hyphae of the fungus can be made out. The fungus (? *Nectria* sp.) is probably a wound parasite and therefore careful attention should be paid to all wounds.

A disease of cacao trees in Surinam is called by the planters 'root disease'. A root disease, probably caused by some Hymenomycetous fungus, is known in the West Indies, and one caused by *Macrophoma vestita* is known in Central America. It is possible that one of these fungi may be the cause of the Surinam disease.

There is still another disease in Surinam which was not more closely investigated; this was characterized by the drying up of the tops of the young twigs. The disease appears similar to that known in the British West Indies and caused by *Diplodia cacaoicola.*

The darkening of the fruits of cacao is stated by many planters to cause much damage; but it must be remembered that often the difference between this disease and the hardening of the fruits, which accompanies the witch broom disease, is not understood. This darkening of the fruit was noted in Trinidad, and later in Grenada. Diseased fruits were sent to Kew and the fungus was identified as *Phytophthora omnivora.*

A very full account is given of the witch broom disease. This includes a review of previous work, the results of an inquiry among Surinam planters, and of the author's own inquiries and investigations.

SCIENTIFIC AGRICULTURE.

The following is an extract from the address made by His Majesty the King on the occasion of the opening of the new buildings in the University of Cambridge for the promotion of original research in agriculture:—

I am very glad to know of the educational work in connexion with the great industry of agriculture which you have undertaken. In common with most branches of industry, agriculture has in modern times come to depend for its success and extension upon the unremitting application to it of the results of scientific investigation. No greater service can be rendered to this ancient industry than to furnish it with the means of research and instruction, which are essential in order that labour may be directed in profitable channels.

EDUCATIONAL.

Harrison College, Barbados.

The following is the report on the examination in agricultural science, conducted by Mr. H. H. Cousins, M.A., F.C.S., Government Agricultural and Analytical Chemist, Jamaica :—

Six students entered for this examination. The marks obtained on the whole work vary from a maximum of 83 per cent.—Bancroft—to a minimum of 46 per cent., with an average of 67 per cent. I mention this result as a striking proof that the higher standard of work I felt justified in asking for in this examination has been very adequately met both by the teaching staff and the taught.

A comparison of the work submitted by the class in 1901 with that sent in in 1903 is truly surprising. The subject is now no longer an ordinary school subject strictly limited to mere text-book knowledge and practically devoid of technical value and insight. The papers sent are, for the most part, of a high standard and display a technical, agricultural and practical attitude that is highly creditable both to Professor d'Albuquerque, his staff and his pupils.

As three years have now elapsed since I was first privileged to examine agricultural science at Barbados, I may perhaps be permitted to express an opinion as to the progress of this work. The agricultural science course at Barbados is a branch of the secondary education at Harrison College ; it might therefore seem, at first sight, unfair to expect any approach to a true technical standard of teaching under such conditions. I recognized, however, that in the Island Professor and his staff, with the reflected stimulus of the Imperial Department, Barbados possessed the requisite machinery for attaining a standard of high efficiency in the teaching of agricultural principles specially focussed to the needs and circumstances of the colony.

I therefore deliberately set myself to establish a standard in these examinations that should raise 'Agriculture' from its well-merited contempt as a school or 'South Kensington' subject to a level capable of expressing some practical insight into the actualities of the local industry.

The results in 1902 encouraged me in this aim, and the outcome of this last examination has entirely justified the opinion I had formed. Without departing from the limits of the syllabus, questions were set involving agricultural 'nous,' so as to elicit the information in the form in which alone such knowledge can be of use in practice. Had the class been taught in routine lines and from text-books only, the marks obtained would have been low. I am indeed pleased and proud to be able to record that, in the majority of cases, the questions were treated in a style and spirit deserving of all praise. These results must be recognized as an undeniable proof that the work at Barbados is not only educational but is also imbued with that technical and practical spirit, which is necessary if agricultural science is to be taught to any adequate purpose.

The practical work in Sugar Chemistry showed a fairly uniform competence in the performance of the standard method of sugar analysis involved in modern factory control.

Barbados.

The annual report of the Inspectors of Schools at Barbados contains the following notice of the educational work of the Imperial Department of Agriculture :—

We would again record, with much appreciation, the assistance rendered to elementary education by the Agricultural and Science Departments. The lectures of Dr. Longfield Smith on the study of nature were continued until June at the four centres arranged in the previous year. The teachers attended regularly, and the increased interest manifested by the pupils at the annual examination in the object-lesson exercises, and also in the cultivation of plants, mostly in pots or boxes, but at a few schools in gardens, was evidence that the work of the lecturer had not been fruitless. At the local exhibition held at Lower Estate on January 12, 1904, the exhibits from the schools were fewer than on previous occasions, we think from local disadvantages, but the character of the exhibits was acknowledged by every one to be distinctly superior to that of those shown at previous exhibitions. Most of the prizes on this occasion were obtained by pupils in the Mount Tabor, Turner's Hall, Clifton Hill, St. Augustine's, St. Matthew's, and Greenwich Schools.

MALTESE DONKEYS.

In May 1901, a fine Maltese jack 'Orphan Boy' and a jenny of the same breed were imported from the United States by the Imperial Department of Agriculture and placed at the Skerrett's Farm at Antigua. Both have since grown into handsome and valuable animals. In September 1903, the jenny gave birth to a foal which is represented in the above illustration. Another jack, 'John B, Junior,' was imported from the United States in June 1901, and placed at the Agricultural School at Dominica. A half-bred jack 'Bismarck,' obtained from Jamaica in March 1901, has proved a great success at Nevis. The Department is anxious to obtain a good half-bred jack similar to the last from one of the other islands.

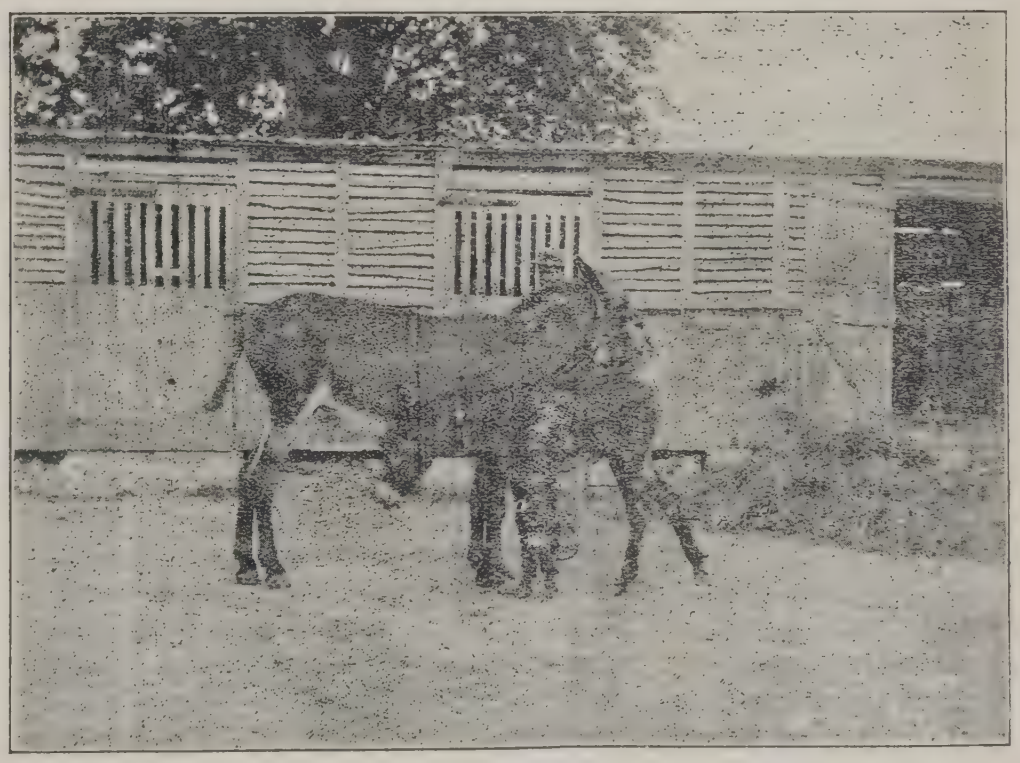


Fig. 6. Maltese Jenny and Foal at Antigua.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 127 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, APRIL 9, 1904. No. 52.

NOTES AND COMMENTS.

West India Committee Circular.

During the past year this Circular has been largely extended and improved. It is now a fortnightly publication likely to prove of great value to the West Indies. A new feature in connexion with the efforts of the West India Committee is the organization of lectures on subjects of interest to these colonies. On March 8, a lecture was delivered at the Committee Rooms (15, Seething Lane, E.C.,) by Sir Patrick Manson on 'The Disease Problem of the West Indies.' A summary of this lecture, published in the *West India Committee Circular* of March 15, deserves careful attention. It may be mentioned that all the Publications of the Imperial Department of Agriculture are obtainable at the West India Committee Rooms.

Horse Breeding in Jamaica.

A committee of the Jamaica Agricultural Society has recently formulated plans for the improvement of horses in Jamaica.

It is argued that the industry needs resuscitation and that efforts in this direction should not be left entirely to private enterprise. It is recommended that four approved sires and also four approved jacks be placed at the disposal of the peasantry in the parishes of St. Elizabeth, St. Catherine and St. Ann at reduced fees.

In the event of suitable animals not being procurable, it is recommended that the society be empowered, as soon as a Stock Farm is established, to obtain a stallion of the type used for getting hunters in England and a jack of the Maltese breed.

Seed Potatos.

The most satisfactory sort of English potatos to plant in the West Indies is that known as the 'Bliss Triumph' Potato. It is the one largely grown at Bermuda for export to the New York market and after careful trial in the West Indies it has given the best results of any. The difficulty is to obtain the seed potatos early enough in the autumn to allow them to be planted before the dry season sets in, in the Windward and Leeward Islands, in November and December of each year. The Imperial Department of Agriculture is prepared to obtain (at cost price) seed potatos to be delivered in the West Indies early in September next. The cost last year was at the rate of 18*s.* per barrel. Those desirous of obtaining supplies of English seed potatos are requested to communicate with the officers of the Department in the several islands not later than May 1 next.

Supply of Paris Green.

During the period when the cotton worm is prevalent in the West Indies there is possibly no article likely to be in more urgent demand than Paris green. This is an aceto-arsenite of copper and is regarded as the most effective substance yet known for the treatment of the cotton worm. Indeed, without it, there would be little chance of making the industry remunerative in any locality where the worm is common. As already advised in these pages, the first thing to be done by the cotton grower before the next planting season is to provide himself with a supply of Paris green and keep it on hand ready for immediate use. Probably Paris green will be procurable locally in all these colonies at a reasonable cost. Where, however, any difficulty is likely to be experienced, the material might be imported direct from Messrs. Gillespie Bros. & Co., 4, Stone Street, New York, Mr. James A. Blanchard, 80 and 82, William Street, New York, or Messrs. Legget and Brother, Agricultural Department, 301, Pearl Street, New York, or other manufacturers.

Agricultural Progress in Ceylon.

In a paper read before the Royal Colonial Institute by Mr. John Ferguson, C.M.G., M.L.C., on 'Ceylon from 1896 to 1903', it is shown that there has been most satisfactory progress in the principal agricultural industries of the island.

Coffee, which twenty years ago was the staple crop, is now a thing of the past; its place has been taken by tea, cacao, cardamoms and rubber. The rise of the green tea industry has all been within the last five years. In the eight years, cacao cultivation has expanded from 21,000 to about 35,000 acres, the exports having risen in that period from 31,000 cwt. to about 60,000 cwt. The area under cardamoms has been doubled, the exports in 1903 being 910,000 lb.

The development of the new rubber-growing industry has been most satisfactory: there is no risk of over production, and Ceylon rubber has already secured a high character and good price in the London market.

Vegetables of Costa Rica.

An article entitled 'Gemüsepflanzen von Costarica' by C. Wercklé appears in the March issue of *Der Tropenpflanzer*, which gives a number of facts with regard to the vegetables used in that country.

Among the plants, the leaves and young shoots of which are used as vegetables, may be mentioned the gourd, the 'christophine' or 'cho-cho' (*Sechium edule*), the sweet cassava, the papaw (*Carica Papaya*) and other species of *Carica*, also a wild *Cyclanthera*. There are also used the young leaves of the 'chicasquil' (*Jatropha multifida*?), the very young leaves of the red variety of the 'liquisque' or tannia (*Colocasia esculenta*), and the leaves of a tree-nettle (*Boehmeria* sp.); finally there are eaten the flowers of the 'itabo' (*Yucca elephantipes*?), and the inflorescence of one of the Commelinaceae, probably a *Tradescantia*.

The tomato, egg plant (*Solanum Melongena*), Spanish pepper (*Capsicum annuum*), 'chayote' or christophine (*Sechium edule*), 'tacacos' (*Sechium* sp. or *Cyclanthera* sp.?), the unripe fruits of species of *Carica*, and of *Passiflora quadrangularis*, var. *macrocarpa* ('Granado real') are the most important native fruit vegetables. Peas are grown in high lands and thrive very well, lentils are uncommon, lupins have only recently been tried. Beans are one of the chief foods and thrive excellently, there are two main kinds of the native bean (*Phaseolus lunatus*). The ochro (*Hibiscus esculentus*) is only planted here and there, mainly by negroes. An Asclepiad (*Gonolobus edulis*), bears fine fruits as large as a child's head, which when quite young are liked as a vegetable.

The tannia (*Colocasia esculenta*) and two species of *Dioscorea* are the only foreign tubers cultivated; the native ones are sweet potato (*Ipomoea batatas*), Irish potato (*Solanum tuberosum*), 'cho-cho' (*Sechium edule*) and sweet cassava (*Manihot Aipi*).

Trade and Agriculture of British Guiana.

According to the *Colonial Report on British Guiana* for 1902-3, the total value of colonial produce exported during the year was £1,673,549. The total export of sugar was larger than it has been since 1887. In that year the export of sugar reached 134,874 tons, at an average value of £13 6*s.* 8*d.* per ton. The average value for last year works out at £8 13*s.* 5*d.* per ton, the total value being £1,042,023. There was a considerable increase in the amount of rum exported, but the value of this was only £135,670 as compared with £160,846 during the previous year. The exports of molasses, which were over two and a half times those of the previous year, were valued at £10,496. Reference is made to the increase in the shipments of sugar to Canada, this trade having received considerable impetus since the close of the year under review.

The acreage in cane cultivation has again increased, 73,193 acres being under cane at the end of the year. The experimental cane cultivation under the Board of Agriculture was actively proceeded with during the year: the new varieties of sugar-cane have attracted much attention, all the estates in the colony now taking part in the work.

The principal minor industries in the colony are rice, cacao, coffee, cocoa-nuts, plantains and bananas, and stock raising. There was a decrease in rice cultivation, due, it appears, to unfavourable weather. The crop, representing the cultivation of 16,628 acres, was estimated at 395,948 bags (of 120 lb. each) of paddy. It is shown that the extension of rice cultivation has caused a steady decline in the rice imports. In addition to the exports of cacao (93,917 lb.) a considerable quantity was sold to the local chocolate factory; the coffee grown was all consumed in the colony. Reference is made to the work of the newly appointed Board of Agriculture, especially to its endeavours to interest the people in agriculture by means of shows, to promote the spread of agricultural knowledge, and to improve the breeds of live stock in the colony.

The Protection of Native Plants.

A lecture was recently delivered by Dr. Robert T. Jackson before the Massachusetts Horticultural Society on the above subject. The following is a brief *résumé* of the lecture:—

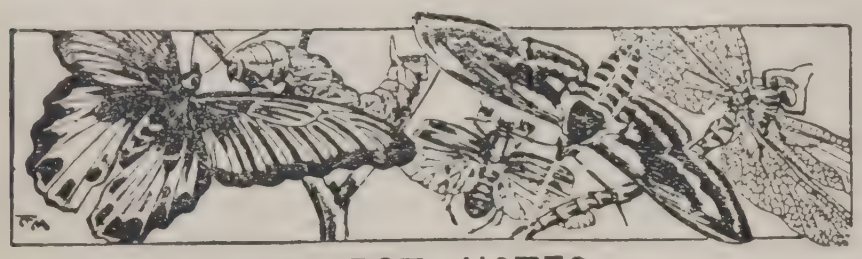
The effort to do something to protect and maintain our wild animals and plants, instead of indiscriminately and even wantonly destroying them, is seen in a number of ways. Our fish and game laws look to the preservation of game animals; the Audubon Society attempts to check the destruction of our native birds; the widespread forestry movement has attained an important standing as an effort to protect, improve and increase our forest areas. The larger plants or trees need protection and fostering care most emphatically.

What causes the disappearance of plants? First and foremost are the axe and the plough. With the cutting down of forests, the spread of cultivated land and the extension of towns and cities, regions, once populated by native animals and plants, give way to the changed conditions. Plants are often reduced in number by thoughtless picking in unreasonable quantities; the principles that should be urged are: gather in moderation, cut the stem and not tear it off, never pull up the root except for transplanting, and, if there be reason to believe that a plant is rare, leave it to increase its kind by seed and root. Children should have the fact instilled into them that the plant, as a living organism, has a right to existence.

After the axe and the plough, the worst enemy of our native plants is the commercial collector: owners of land could doubtless do much to check this by posting notices having reference to trespassing.

The mountain laurel (*Kalmia latifolia*), holly, and the ground pine are plants that are much used in America for decorative purposes. As these are gathered in such large quantities, and the source is limited, some steps should be taken to protect them from more or less total extinction.

Societies for the protection of native plants have been organized in numerous places: such organizations are of considerable value in spreading a spirit of protective care of plants for their own welfare.



INSECT NOTES.

Ticks on Fowls.

The Imperial Department of Agriculture has recently received, from a correspondent in Barbados, specimens of a tick from a fowl house. The specimens were accompanied by a letter stating that the fowls had been drooping and a few had died and that it was suspected that this tick might be the cause.

Reference to this pest (*Argas* sp.) is found in the *Agricultural News* (Vol. I, pp. 74 & 106). On p. 106 Mr. J. H. Hart, Superintendent of the Royal Botanic Gardens, Trinidad, is quoted as saying: 'It kills fowls rapidly unless they are treated. We have found kerosene and cocoa-nut oil, in equal parts, very effective.'

In Barbados pure kerosene oil has been recommended for disinfecting the poultry house, and also white lime wash with 4 oz. crude carbolic acid to the gallon of wash. These may be put on with a spraying pump, or with a brush, taking care to cover all parts of the interior and to penetrate all cracks and crevices. Careful disinfection of the poultry houses and fowl runs, and treatment of the fowls themselves will be necessary in order to exterminate the pests.

Scale Insects in Cyprus.

The *Cyprus Journal* (Vol. I, no. I) has an interesting article on Carob scale disease. The Carob (*Ceratonia siliqua*) is a tree which, while not yielding crops of high value, is of considerable importance on account of its contribution to the general supply of stock food in the island. Several scale insects are known to attack the Carob of which the White Scale (*Aspidiotus ceratoniae*) is the most serious. This appeared a few years ago in small numbers and in scattered localities, but is now generally distributed and has become in some places a serious pest.

In the village of Kili the attack of the White Scale has been the worst. Here, in the valley lying between two ranges of hills, the atmosphere is hot and moist and peculiarly adapted to the multiplication of the scale insects. At the same time, the Director of Agriculture states that in this badly infested locality he had never observed the Lady-bird, *Chilocorus bisustulatus*, which is common in other parts of the island, nor had he seen any other parasite on the scale, and he considers that these facts explain why this locality should be more badly infested than others.

The Carob not being considered of sufficient economic importance to warrant the processes of spraying or fumigating, the Director of Agriculture proposes the following method of combating the scale disease :—

All the leaves, fruit and twigs are removed in January and the trunk and limbs of the tree are white-washed with a thick solution of slaked lime containing 3 to 5 per cent. petroleum. This is put on with a brush or a piece of cloth attached to a stick. This treatment is not costly and is quite effective. One year's crop from the tree will be lost, as all the energies of the tree will be devoted to recovery from the stripping of the leaves and twigs. Watch should be kept of the trees for several years after this treatment and all scale-infested leaves, fruit or branches removed.

Cockroaches.

Several notices have appeared in the columns of the *Agricultural News* regarding the destruction of cockroaches. The following method, from *L'Agriculture pratique des pays chauds*, seems simple and likely to be effectual :—

Wide mouth bottles 6 inches or 8 inches in height are partly filled with oil [sweet oil?] and placed in the haunts of the insects. The bottles should be slightly tipped up and fastened in this position to make the ascent easier to the cockroach. Attracted by the odour of the oil the insect plunges into the bottle and the oil, where he is killed by the action of the latter.

Banana Weevil in Madagascar.

The *L'Agriculture pratique des pays chauds* contains an article on this subject in which the damage to the 'Fig' banana by a weevil is mentioned and a description of the weevil in its different stages is given. This insect is the same as the Banana Weevil known in certain of the West Indian Islands (*Sphenophorus sordidus*), which tunnels in the stems and frequently causes the death of the tree.

The special importance of this pest in Madagascar is due to the fact that the bananas are used as shelter for cacao, and the destruction of this cover gives the cacao a set-back for five or six months.

No remedies are suggested, except to choose those varieties which are least susceptible to the attack.

Mr. H. Maxwell-Lefroy, formerly Entomologist on the staff of the Imperial Department of Agriculture, recommended the use of lime, ashes, soot, or refuse tobacco, at the base of the banana stem, to prevent the entrance of the adult borer, and the destruction of the infected stems by burning, by treatment with quick lime or by burying them, for the destruction of any eggs, larvae, pupae or adults that might be within. As a single banana stem sometimes contains as many as fifty borers in different stages, this would seem to be quite a rational method.

The Tsetse Fly and Sleeping Sickness.

An interesting article in *Nature* of February 1, 1904, on sleeping sickness rehearses the proof that the tsetse fly is responsible for the transmittance of this fatal disease. For 100 years the sleeping sickness has been known in Africa, but only recently has the nature of the disease and the method of its transmission been well understood.

The tsetse fly disease ('Ngana') of cattle was shown by Colonel Bruce, R.A.M.C., F.R.S., to be caused by a microscopic organism, called by scientists a trypanosome. This organism is introduced into the blood by the tsetse fly when it bites its victim, having been derived from an unhealthy animal. Surra disease of horses in India is also caused by a trypanosome and there is a similar disease of cattle in South America.

In 1902, trypanosomes were discovered in man. Since that time much work has been done on the sleeping sickness and the relation between it, the presence of trypanosomes and the distribution of the tsetse fly, and it has been demonstrated that the distribution of the disease and of a certain species of biting fly are identical. Trypanosomes in the blood produce only a characteristic fever, but in cases where a trypanosome has gained entry to the cerebrospinal fluid, sleeping sickness and consequent death result.

There is no treatment for the sleeping sickness that affords any hope of a cure ; the disease is always fatal.

SCIENCE NOTES.

A Weather Plant.

About thirteen years ago M. Nowack, an Austrian, described a 'Weather plant' supposed to have been discovered by him. The plant in question proved to be what is known in the West Indies and elsewhere as the 'Crab's Eyes.' It is a slender vine with pinnate leaves, producing small, bright-red seeds with a black spot. The scientific name is *Abrus precatorius*. The first name was given on account of the softness of the leaves, and the second (prayer or paternoster pea) because the bright-coloured seeds were sometimes used as a rosary.

M. Nowack claimed that by closely watching the changes that took place in the position of the leaves and the rise and fall of the twigs and branches he could predict 'changes in the weather and also the occurrence of earthquakes.' After a full and careful investigation made at Kew and elsewhere, Professor F. W. Oliver was in a position to show, conclusively, that the 'Crab's Eyes' plant only exhibited the usual sleep-movements commonly noticed in tropical vegetation and that there was no connexion existing between these movements and changes in the weather or the occurrence of earthquakes.

There appears to be a revival of interest in this matter. It is observed that the subject was recently discussed at a meeting of the Society of Arts in London, but apparently no new facts were brought forward in support of the claims advocated by M. Nowack.

Those interested in the subject will find full information and a detailed account of the investigations above referred to in the *Kew Bulletin* (1890, pp. 1-28).

Propagation of Plants by Leaves.

Herr Lindemuth of Berlin, has published in *Gartenflora* (1903, Heft 18 and 23) the results of his experiments on the propagation of plants by means of their leaves. Horticulturists have long been accustomed to use this means of propagation in a few plants, notably in the *Gloxinia* and certain *Crassulaceae*, among which *Bryophyllum calycinum* [Leaf of life] is a well-known example. It was, however, probably not suspected that the leaves of so many plants could be made to produce roots. In his first communication Herr Lindemuth gives the names of twenty-eight species, of nearly as many different genera, in which his experiments have been successful. These include such plants as the foxglove (*Digitalis purpurea*), the musk (*Mimulus moschatus*), the tomato and the vine. The leaves of thirteen species, including the potato, monkshood (*Aconitum Napellus*) and the common bedding geranium (*Pelargonium zonale*) refused to root at all.

Usually the roots were produced quickly—in the vine in sixteen days, in *Veronica* in seven days, and in the African marigold in eight days—but the amount of time required, and, indeed, success at all, was shown to depend very much on the season when the experiments were made. Thus, in the vine roots were developed in sixteen days in August; but complete failure resulted in September when the leaves perished. In his second communication, the author records success with thirty-four additional species, including three of those with which he had met with failure before. The results so far obtained show that few of the leaves thus experimented on will form buds, only five having done so. (S. A. S. in *Knowledge and Scientific News*, March 1904.)

Yeast.

Yeast is a substance, the uses of which for domestic purposes and in brewing, etc., are well known. Yeast itself is a plant belonging to the group of fungi.

The yeast plant, *Saccharomyces*, differs from most other fungi in that its body consists of a single cell; it is probable that the yeast is a reduced form, being descended from ancestors which possessed a mycelium.

When brought into a proper nutrient medium, such as a sugar solution containing ammonium tartrate (as a source of nitrogen) and minute quantities of mineral salts, yeast proceeds to reproduce. The process is one of budding. A small bulge appears at one side of the cell, which increases in size until it is the same size as the parent cell and is then cut off; the daughter cell then repeats the process. Sometimes the budding proceeds so rapidly that both the daughter and mother cells start budding again before they become separated; in this way we get short chains of cells, each one of which, however, is a distinct plant. The spores of many other fungi are capable of reproducing in this way, by budding, but the buds so produced are capable, given the proper conditions, of giving rise to a hypha and so to a mycelium. The yeast buds have never been made to produce a hypha.

Under certain conditions the yeast plant produces spores. We can make it do this by cultivating it until it is growing vigorously and then spreading it out in a thin film on the surface of a plaster of Paris plate; damp air is continuously passed over the plate. In twenty-four hours the cell contents become finely granular, next we notice four bright points appearing in the cell, and finally the cell contents group themselves around these, and separate off to form four 'endospores', arranged in a tetrad inside the old wall of the mother cell.

Ordinary brewers' yeast is a mixture of various species of yeast; some of these do not bring about alcoholic fermentation, and are either useless or positively harmful. In this lies the advantage of using only pure cultures of particular yeasts, which are known to bring about the desired fermentations. This method is now used in up-to-date breweries.

DEPARTMEMT NEWS.

Mr. George Whitfield Smith, Travelling Superintendent on the staff of the Imperial Department of Agriculture, has been appointed by the Secretary of State for the Colonies to the post of Magistrate for the Northern District of Grenada, to reside at Carriacou. In view of the important agricultural efforts to be carried on there and the value attached to the successful working of the Land Settlement Scheme, Mr. George Whitfield Smith's appointment is calculated to prove of great service in advancing the general interests of that island.

The Secretary of State has approved of the appointment of Mr. William Henry Patterson as Curator of the Botanic and Experiment Stations at Antigua in succession to Mr. W. N. Sands, who has been recently transferred to St. Vincent. Mr. Patterson was sub-foreman at the Royal Gardens at Kew and previously for three years had been employed in the County Technical Laboratories at Chelmsford. His wife is also a skilled horticulturist, trained at Kew. Mr. and Mrs. Patterson are due to arrive at Antigua in the mail of April 13.

GLEANINGS.

Sixty bales of cotton and 200 crates of bananas were shipped from Barbados to England by the S.S. 'Atrato' on March 26.

The *Bulletin* of St. Thomas (D.W.I.) announces that labourers are wanted to plant cotton. Applications to be made to Lawyer Jörgensen.

The second annual sale of stock took place at Woodlands Stock Farm, Grenada, on March 25. The sale included horses, Zebu and Hereford cattle, native milch cows, poultry, etc.

According to a writer in the *Journal d'Agriculture Tropicale*, it is possible to change the sex in the papaw plant. It is stated that if the male papaw be topped, as soon as its sex is ascertainable, the tree will bear good fruit.

The Curator of the Tobago Botanic Station reports that the Parasol Ant is causing considerable damage throughout the island. The small settlers have been assisted by the Botanic Station in destroying this pest with carbon bisulphide.

According to the *Annual Report of the Department of Public Gardens, Jamaica*, the trees of mangosteen, planted behind the Superintendent's house at Castleton Gardens in 1875, fruited heavily during the year. There are now six or seven fruiting trees of this delicious fruit.

Vanilla planifolia grows vigorously at Castleton, and one plant growing over the high limbs of a tree of *Spondias lutea* has produced several pods although the flowers were not fertilized by hand.

The Centenary of the Royal Horticultural Society of England was celebrated on March 7 last. This Society has a splendid record during the last hundred years and deserves the hearty support of lovers of gardens in all parts of the Empire.

A leaflet (No. 100) has recently been issued by the Board of Agriculture and Fisheries: it is entitled 'Pig Breeding and Feeding.' This leaflet will be found to contain much valuable information on the subject with which it deals.

According to the *Consular Report on the trade of Alexandria* for 1902, the exports of cotton were 6,621,608 kantars (about 292,651 tons): this is 16 per cent. more in quantity and 23 per cent. more in value than the average for the four preceding years. The exports of cotton seed amounted to 17,540,515 bushels—9 per cent. less in quantity, but 8 per cent. more in value.

A tree of *Monodora tenuifolia* (natural order *Anonaceae*) is reported by the Curator to be flowering for the first time at the Grenada Botanic Station. A similar tree is, also, in flower at the St. Lucia Botanic Station.

It is stated in the *India-rubber Journal* that rubber planters in the Malay Peninsula are using aluminium cups for tapping purposes. By this means it is hoped to avoid impurities and discolouring due to rust.

At a recent meeting of the Trinidad Chamber of Commerce it was suggested that steps should be taken to advertise the colony for the purpose of attracting tourists. It was stated that a sum of money had been placed by the Government on the estimates for this purpose.

According to official returns recently published by the Board of Agriculture and Fisheries, the estimated total produce of potatos in Great Britain in 1903 was 2,913,713 tons from 564,286 acres. This represents a yield of 5·16 tons to the acre; the average yield for ten years is 5·89 tons.

In the discussion on the estimates in the Jamaica Legislative Council, it was stated by the Colonial Secretary that for eleven months of the year ended March 31, 1904, there had been a cash balance of £251 on the working of the Prison Farm at Spanish Town.

The Curator of the Grenada Botanic Station reports that satisfactory crops of onions have been reaped in the island, during the past season, at Government House grounds, Good Hope estate and the Botanic Station. The seed used was that imported from Teneriffe by the Imperial Department of Agriculture.

It is stated in the *Annual Report of the Jamaica Board of Agriculture* that nearly all the grafted nutmegs at the Hope Experiment Station flowered in January and February, which are the windiest months: many flowers and even leaves were blown off; a few held and the nuts are developing in the same way as the old seedling trees. These were hand-fertilized.

Mr. William M. Smith, Acting Agricultural Instructor at Grenada, writes that sheep manure is being used in large quantities for cacao this year. It is brought in schooners from Venezuela, Bonaire and St. Martins. Artificial manures are also being applied. It is gratifying to observe that the value of high-class culture is being recognized by large and small cacao cultivators in Grenada.

The *Natal Agricultural Journal* of January has an interesting note on horse sickness, due to the bite of a mosquito. It is not shown that the mosquito gets the infection from an unhealthy animal, but this is the case with most of the insect-carried diseases. Protection of horses from night insects is the only effectual preventive, as there seems to be no cure, when once the disease has been contracted.

In reply to a circular despatch of Mr. Chamberlain, September 9, 1902, British Guiana, Trinidad and the Leeward and Windward Islands have expressed themselves in favour of the adoption of the metric system [of weights and measures]; Jamaica and British Honduras recommended the adoption of the system of the U.S.A. The reply of Barbados is, on the whole, unfavourable. (*West India Committee Circular.*)

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London Drug and Spice Market for the month of February:—

The chief talk of the month, whether in social or commercial circles, has been of the Russo-Japanese war. From a business point of view its effects are already being felt on the markets, and advances in the price of Japanese products continue to be the natural result. The tone of the markets, generally, has, however, shown an improvement since our last report, though nothing of a special nature demands notice. The following are the chief items dealt with:—

GINGER.

At the auction on February 10, 20 barrels of Jamaica were offered and sold at the following prices: Small and medium, 39*s.* to 40*s.*; bright, 36*s.* 6*d.*; small dark, 35*s.*, and rough dark, 33*s.* 6*d.* Fair, washed, rough Cochin sold at 27*s.*, while 27*s.* 6*d.* to 28*s.* was paid for slightly wormy, and 23*s.* to 23*s.* 6*d.* for wormy brown. It was reported at this sale that a fairly large crop of the Jamaica product was expected this year, but that it was anticipated to be of unusually poor quality. At the sale on the 17th., prices stood thus: Jamaica common small being bought in at 36*s.*, while cut Cochin unsorted was disposed of, without reserve, at 38*s.* to 38*s.* 6*d.*; fair, good Japan realizing from 23*s.* to 26*s.* At the last sale on the 24th., 870 packages of Cochin were bought in at 57*s.* 6*d.* for good medium cut and 75*s.* for good bold. Two hundred barrels of new crop Jamaica were offered and 30 were sold at 43*s.* for bold dullish and 35*s.* for small dark. Japan limed offered at the same sale was bought in at 25*s.*

ARROWROOT.

At the first sale on the 3rd., 250 barrels of St. Vincent were offered; of these 92 were sold at from $1\frac{3}{4}d.$ to $2d.$ per ℔. for fair manufacturing. At the succeeding auctions, arrowroot was slow of sale and the prices remained as above.

SARSAPARILLA.

At the drug sale on February 4, 22 bales of grey Jamaica were offered and a few were sold at 1*s.* 1*d.* for fair, and for part coarse 1*s.* was wanted. For sea-damaged sarsaparilla a bid of $10\frac{1}{2}d.$ was accepted; 6 bags of fair Lima realized 10*d.*; 9 bales of native Jamaica dull to fair red were disposed of at 7*d.*, and two bales fine bright red, rolled, at 11*d.* At the second sale in the middle of the month the prices remained about the same, at the following quotations: 4 bales fibrous, grey Jamaica all sold at 1*s.* per ℔.; 14 packages of Lima Jamaica, fair quality, all sold at 10*d.*, and 15 other bales at $9\frac{1}{2}d.$ to 11*d.*; Honduras was bought in at 1*s.* 2*d.*

BAY OIL.

Though bay oil does not seem to have been offered at any of the sales during the month, it may be interesting to say that in answer to inquiries made as to the uses of this oil, which is distilled from the leaves of *Pimenta acris*, I am indebted to the courtesy of Mr. J. C. Umney, of the firm of Wright, Layman and Umney, Ltd., Southark Street, London, for the following information:—

'There is a considerable demand for this oil for perfumery purposes and especially for hair washes. It is also used in some considerable quantities in the manufacture of toilet soaps, and if there should at any time be a large falling off in the clove crops, it is not impossible that bay oil might come into use for many of the purposes for which oil of cloves, oil of cinnamon leaf, oil of pimento and other eugenol-containing oils are required.

Synthetically produced vanillin is used to a very considerable extent, and in its manufacture eugenol is used as a starting point. The adoption of bay oil instead of that of the clove and other oils mentioned would depend upon the price at which it could be produced in competition. The sweet and characteristic fragrance of bay oil is not due to eugenol, but to certain lighter fractions. It would thus seem that the extended uses of bay oil are possible in the future and that it is a likely substitute for many other well-known essential oils.'

KOLA NUTS, LIME JUICE, MUSK SEED, ETC.

Of other products 17 baskets of fair, fresh, West Indian kola nuts were offered at the auction on the 18th., 8*d.* being demanded for them, but none sold. At the same sale 19 hogsheads of Dominica unworked lime juice were all sold at $10\frac{1}{2}d.$ per gallon, and one case of ordinary Dominica distilled lime oil was disposed of at 1*s.* 3*d.* per ℔. In the early part of the month one case of slightly mouldy musk seed was disposed of at 8*d.* per ℔. At the same sale a large quantity of good annatto seed from Ceylon was offered, $3\frac{1}{2}d.$ per ℔. being wanted, but some of it was afterwards disposed of at $3\frac{1}{4}d.$

Mace, nutmegs and pimento were all in small demand at usual rates.

West Indian Products in Canada.

The following report on West Indian produce in Canada has been received from Mr. Alexander Wills, Import Agent, Montreal:—

SUGAR.

Prices have turned in favour of sellers and we sincerely trust this will continue for the benefit of our West Indian friends.

Grocery sugars are in good demand, and those in colour under 16 D.S. sell well.

MOLASSES.

The new ruling of the Government regarding imported molasses has brought forth many opinions on the advisability of the move. The new rule is that all molasses shall be tested by subjecting the article to indirect instead of direct polarization test. The duty on molasses testing 40 degrees, or over, cane sugar or sucrose, is $1\frac{3}{4}$c. per gallon. Molasses under 40 degrees and not less than 35 degrees is charged $1\frac{3}{4}$c. per gallon and in addition 1c. for every degree or part of a degree under 40 degrees. All under 35 degrees must pay a duty of $\frac{3}{4}$c. per ℔. The effect is the complete extinction of the low-grade molasses trade. Ontario is the principal centre of this trade, and it opens up another opportunity for good molasses. Trade in this product is fair, but buyers look for lower prices in the Barbados product, owing to report of a large crop. General prices have fallen from 2 to 5c. per gallon, Ontario showing the heaviest drop.

LIMES AND PINE-APPLES.

The season for these will begin in April, and I shall be glad to have timely advices of shipments so as to make arrangements ahead. An earnest endeavour should be made in Dominica and Jamaica to use cases instead of barrels, and pack pines eighteen to the case.

MARKET REPORTS.

London,—March 15, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', March 4, 1904; 'The West India Committee Circular,' March 15, 1904; and 'The Public Ledger,' March 12, 1904.

Aloes—Barbados, 13/- to 35/- ; Curaçoa, 14/6 to 35/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—1/6 to 1/11 per lb.
Bees'-wax—£7 to £7 5*s.* per cwt.
Cacao—Trinidad, 60/- to 68/- per cwt.; Grenada, 52/- to 59/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 60/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, ordinary, 38/- to 60/- per cwt.
Copra—Trinidad, £17 per ton, c.i.f.
Cotton—Carriacou 8¾*d.* per lb.; West Indian Sea Island, 1/4 to 1/5 per lb.
Divi Divi—No quotations.
Fruit—
  Bananas—Jamaica, 5/- to 7/- per bunch.
  Grape Fruit—10/- to 11/- per case.
  Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
  Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 33/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/8 to 2/11; Cake, 1/1 to 1/2 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 9*d.* to 1*s.* 2*d.* per gallon; Concentrated, £12 to £12 10*s.* per cask of 108 gallons.
Lime Oil—No quotations.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/9 to 2/3 per lb.
Nitrate of Soda—Agricultural, £9 15*s.* per ton.
Nutmegs—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per lb.
Pimento—3¼*d.* to 3⅞*d.* per lb.
Rum—Demerara, 9*d.* to 10½*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 1/- to 1/1 per lb.
Sugar—Crystallized, 14/3 to 15/3 per cwt.; Muscovado, Barbados, 14/6 per cwt.
Sulphate of Ammonia—£12 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

Montreal,—March 9, 1904.—Mr. Alexander Wills.
Cocoa-nuts—Trinidad, $24·00; Jamaica, $24·27 per M.
Coffee—Jamaica, 8¼c. to 9½c. per lb.
Ginger—Jamaica, 6¾c. to 8c. per lb.
Molasses—Barbados, 31c. to 34c. per gallon.
Molascuit—Demerara, $1·32 per 100 lb.
Nutmegs—Grenadas, 110's, 20c. to 21½c. per lb.
Pimento—Jamaica, 8c. to 8¼c. per lb.
Sugar—Crystals, $2·09¼ per 100 lb. in bond.
—Molasses, $1·24 to $1·24¾ per 100 lb. in bond.

New York,—March 4, 1904.—Messrs. Gillespie Bros. & Co.
Bananas—No quotations.
Cacao—Caracas, 13c. to 14c.; Jamaica, 10½c. to 12½c.; Grenada, 12⅝c. to 12⅞c.; Trinidad, 13c. to 13¼c. per lb.
Cocoa-nuts—Trinidads, $22 to $24; Jamaicas, $26 to $28 per M., selected.
Coffee—Jamaica, fair to good ordinary, 6¾c. to 7½c. per lb.
Ginger—Jamaica, 6½c. to 7c. per lb.
Goat Skins—Jamaicas, 53c. per lb.
Grape Fruit—No quotations.
Oranges—No quotations.
Pimento—7½c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3 1/32c.; Muscovados, 89°, 2 15/16c. to 2⅞c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 23, 1904.—Messrs. Bennett Bryson & Co., Ltd.
Molasses—16c. per gallon (Imperial).
Sugar—$1·40 per 100 lb.

Barbados,—March 26, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.
Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$12·50 to $13·50 per 100 lb.
Cocoa-nuts—$10·00 per M. for husked nuts.
Coffee—Jamaica and ordinary Rio, $10·00 and $12·00 per 100 lb. respectively.
Hay—96c. per 100 lb.
Manures—Nitrate of soda, (none in stock); Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—14c. per gallon (puncheon included).
Onions—$3·60 to $3·90 per 100 lb.
Potatos, English—$1·60 per 100 lb.
Rice—Ballam, $5·00 per bag (190 lb.); Patna, $3·60 per 100 lb.
Sugar—in hhds., $1·60 per 100 lb. (packages included).

British Guiana,—March 24, 1904.—Messrs. Wieting & Richter.
Arrowroot—St. Vincent, $7·50 to $7·75 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 12c. per lb.
Dhal—$3·90 to $4·00 per bag of 168 lb.
Eddoes—$1·00 to $1·44 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, (casks included).
Onions—4c. to 6c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per lb. (retail).
Plantains—36c. to 68c. per bunch.
Potatos, English—$2·25 to $2·50 per barrel.
Rice—Ballam, $4·65 per 177 lb., ex store; Creole, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·20 per barrel.
Tannias—$2·16 per bag.
Yams—White, $1·68 per bag.
Sugar—Dark Crystals, $1·88½; Yellow, $2·30 to $2·40; White, $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·50 per M.

Trinidad,—March 24, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.
Balata—No quotations.
Cacao—Ordinary, $13·00 to $13·25; Estates, $14·00 to $14·50 per fanega (110 lb.).
Cocoa-nuts—$20·00 per M., f.o.b., selected in bags of 100, (husked).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—67c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6¾c. to 7c. per 100 lb.
Copra—$2·75 to $3·00 per 100 lb.
Onions—$3·25 to $3·50 per 100 lb.
Molasses—15c. per gallon (without cask).
Potatos, English—$1·25 to $1·40 per 100 lb.
Rice—Yellow, $4·25 to $4·50; White Table, $5·25 to $6·00 per bag.
Sugar—Yellow Crystals, $2·25; Molasses Sugar, $2·00 per 100 lb.

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COTTON.

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[52.]

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A COLONIAL EXHIBITION

Will be held in this island on May 23, 1904.

(Sgd.) H. H. R. CHAPMAN,
Vice-President.

Curaçoa,
Dutch West Indies,
March 5, 1904.

DUSSEL,
Secretary.

FOR COTTON GROWERS:

'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.)

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton Growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 53. BARBADOS, APRIL 23, 1904. PRICE 1*d*.

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West Indian Cotton.

SEVERAL large shipments of West Indian Cotton have lately been forwarded to Manchester and the reports to hand as to the quality of the staple are uniformly satisfactory.

In every instance where there has been a wise selection of soil and climate and where the cultivation and ginning have been carefully attended to, the financial results are most encouraging. We hope to publish the details as they come to hand.

The chief drawback experienced during the past season was the attack of the cotton worm. Where the worm did not appear at all, or where it was succesfully kept under control, the return in lint per acre was quite as good as in the Sea Islands of South Carolina. As it is admitted that in most parts of the West Indies field labour is cheaper and more reliable than in the United States, there can be little doubt that the profits likely to arise, on an average of years, from the best qualities of cotton grown in these colonies, should be as satisfactory as in any part of the world.

The best results have been obtained where the soil was originally of good quality or where it was manured and carefully cultivated. It should be clearly understood that it is useless to expect to grow large crops of cotton, or indeed of anything else, in poor soils, or even in good soils unless the cultivation receives constant attention and the plants are kept free from the cotton worm and other enemies.

As regards the sort of cotton to grow, it has been conclusively shown that the best is Sea Island cotton. This, as is well known, is a native of the West Indies—a geographical fact of great importance—and in

addition it has been proved by experimental cultivation, over several thousand acres during the past season, that West Indian Sea Island cotton, when well cultivated and properly prepared, is of exceptional quality and obtains high prices.

If it should be shown, after careful trial, that any locality is found unsuitable to the growth of Sea Island cotton, it may be regarded as likely to be unsuitable for the growth of any cotton that will pay to cultivate. The Upland cotton plant is admitted to be hardier than the Sea Island cotton and it yield sa heavier crop, but it is usually worth only one-half the value of Sea Island cotton, and in the competition with other countries, which will inevitably follow the high prices now ruling, the cultivation of Upland cotton must prove still less remunerative.

Sea Island cotton, on the other hand, can only be produced in a few localities and probably in no locality more favourably than in the West India Islands. As already indicated in these pages, it is of the utmost importance that only selected seed of Sea Island cotton should be planted for the next crop and that the seed be disinfected beforehand.

In order to control the attacks of the cotton worm—the principal enemy so far met with in the West Indies—it is necessary that for every acre planted in cotton there should be obtained and kept ready for use, at a moment's notice, 3 lb. of Paris green and 18 lb. of slaked lime. After the experience of last season, it should be regarded as useless to attempt to grow cotton unless the cotton worm is entirely kept in check. The Paris green and lime treatment has everywhere proved successful.

The season for starting operations for the next crop will soon be here. Already, selected seed of the best Sea Island cotton sufficient to plant 7,000 acres has been secured by the Imperial Department of Agriculture. This, after being disinfected, will be distributed to growers at cost price. Those who propose to plant cotton next season are advised to consult the local officers of the Department and after making a judicious selection of land to begin at once to prepare and manure it.

If the opinion of the Department were to prevail, only capable and experienced planters would be advised, at present at all events, to embark in cotton growing. It is not desirable for amateurs or persons without means to attempt a cultivation of this sort. The safer course, for all new industries, is for them to be taken up by skilled agriculturists and carried on in a systematic and careful manner, so that the results attained may be published for the information and guidance of the general community.

In view of the full and clear statement of facts respecting cotton growing in the West Indies contained in the recently published number of the *West Indian Bulletin* (Vol. IV, no. 4), no intelligent planter should be in doubt as to the conditions necessary for establishing a successful cotton industry. All who propose to plant cotton are recommended to study carefully the hints given in the work above referred to, and it is urged in the interests of all concerned that experiments with cotton growing in the West Indies be undertaken by the leading and more experienced planters in order that during the coming season it may be definitely and authoritatively ascertained what are the prospects of a cotton industry on a large scale as compared with sugar, cacao, fruit and other well-established industries in these colonies.

SUGAR INDUSTRY.

Demerara Seedling in Hawaii.

The Demerara *Argosy* of April 6 has the following reference to the success that has attended the cultivation of Demerara seedling cane No. 117 in Hawaii:—

At the usual meeting of the Hawaiian Sugar Planters' Association, when reports were received and considered from the various committees on the work for the year, Mr. Eckhart, Director of the Experiment Station, in discussing the merits of the different cane varieties, wrote: 'For irrigated plantations, Demerara seedling No. 117 is, in my opinion, the most promising variety, as at the experiment station field it easily leads all the other canes. On one of the Oahu plantations, where it has been tried in competition with Striped Singapore, Tiboo Merd, Rose Bamboo, and Fiji Purple, it yielded from a ton to a ton and a half more sugar to the acre than the other varieties. It is a rather grassy cane, that is characterized by thick stooling, giving heavy tonnage per acre, and by juices of rather low purity except with ratoons, when purity is good. Louisiana Striped has been planted on quite a large scale (about 15 acres, I think) on one irrigated plantation and does very well, that is, fully as well as Lahaina. It flowers earlier and more generally than Lahaina or Rose Bamboo.' It was pointed out in conclusion that the cultivation of cane on cane land in Hawaii is practically continuous and that while burning of trash and leaves is general, it is the exception and not the rule to rest the lands, or to greensoil them by the cultivation of leguminous plants.

Molascuit.

The following note relating to the manufacture of molascuit is taken from the Demerara *Argosy* of April 6. Special reference is made to the fact that this product enjoys a decided advantage over other sugared stock foods on account of the absorbent properties of the megass:—

Mr. George Hughes, the patentee of the now famous cattle food, molascuit, has written to a correspondent in Demerara suggesting that manufacturers in this colony should turn out an article containing at least 55 per cent. of sugar. In support of this suggestion, he states that there are on the market many sugared stock foods, but as these are made of materials that do not possess the absorbent qualities equal to a megass meal, their sugar content is lower. He thinks, therefore, that molascuit manufacturers should push this advantage to the utmost by producing molascuit containing at least 55 per cent. of sugar, thus rendering competition by those other stock foods impossible, except from the disadvantageous position of an admittedly inferior article.

United States Concession to Cuba.

The following is an extract from an article on the subject of the Cuban reciprocity treaty that appeared in the *Louisiana Planter* of March 12, 1904:—

From all these data we see that our reciprocity treaty with Cuba has been a very decided boomerang, doing no good to the Cubans, but returning to us and inflicting much injury upon us. It has not benefited the Cubans by making Cuban sugar worth more in that island than similar goods in San Domingo, or Jamaica, or Trinidad. On the contrary, the prices of sugars have been lowered and this decline has forced down prices throughout the West Indies generally and now, on the part of the Cubans themselves, in order to cover the deficiency in revenues arising from the diminished duties levied upon their chief imports from the United States, they simply elevated the duties 20 per cent. or more, and now collect as much as ever on the bulk of American productions entering the island.

A New Sugar-producing Plant.

Several references have recently been made in scientific and other journals to a new source of sugar. We reproduce the following account of the plant from the *Gardeners' Chronicle* of March 19:—

In the early part of 1901 the authorities at Kew, as we learn from Mr. Hillier, received from H.B.M. Consul at Asuncion, Paraguay, fragments of a Composite plant credited with possessing a remarkable sweetening property, a few leaves being sufficient to sweeten a strong cup of tea or coffee, giving also a pleasant aromatic flavour. The plant was discovered growing in the highlands of Amambaya and near the source of the river Monday by Dr. Bertoni, and described by him in *Revista de Agronomia*, ii, pp. 35-7 (1899) under the name *Eupatorium rebaudianum*. From the meagre material received at Kew, it was found that the smallest portion caused a persistent sweetness in the mouth, and further that the floral structure of the specimen agreed more nearly with the genus *Stevia* than with *Eupatorium*, its affinity being with *S. collina*, Gardner. The foregoing facts are gathered from the *Kew Bulletin* for 1901, p. 173; and we find upon inquiry that living plants or full herbarium specimens are still desired at Kew to facilitate the identification of this interesting plant.

THE MISCHIEF OF WRONG THEORIES.

The following interesting extract is taken from the *Monthly Weather Review* of the Weather Bureau of the U.S. Department of Agriculture for December 1903:—

During the past century there has been such steady progress in all branches of science that the more intelligent portion of the community has abandoned those notions with regard to astrology, alchemy, spontaneous generation, witchcraft, and other philosophies, that were formerly accepted by the most learned. The diffusion of education has raised the children of the present generation above the level of the philosophers of a former generation. And yet we have seen it demonstrated again and again that the popular majority does not fully appreciate the extent of our present knowledge of the laws of the weather, and is still liable to resort to unscientific methods in the hope of accomplishing that to which science has not yet attained.

We have seen communities in America and Australia carried away with the idea that cannonading can produce rain, or in Europe that the ringing of church bells or the offering of prayers can avert droughts and floods. In Southern Europe the agriculturists are but just recovering from the strange belief that hail can be prevented by shooting rings of smoke toward the clouds. During the past ten years a wealthy engineer of Russia has devoted his fortune to the conversion of the people to his idea that the moon controls the weather, and so seriously does his advocacy of this error affect the uneducated agricultural community that the Director of the weather service at Odessa (Klossovsky) has gone to the trouble of publishing an elaborate statement of the errors in fact and theory committed by this engineer. He shows very clearly that Demtchinsky's method of predicting the weather by lunar periods amounts to nothing more than predicting an average condition, an average which very rarely occurs, whereas the departures from it are very frequent. The verifications of these predictions are like the combinations in an ordinary game of chance, where there is an equal number of heads and tails or hits and misses.

As the collection of meteorological statistics depends so largely upon the voluntary work of thousands of unpaid observers, it is to be feared that the good work we are doing in America may be seriously interrupted, if erroneous views are allowed to have an influence in this country as profound as they seem to have in Southern Russia.

We cannot repeat too often and too clearly the general proposition that meteorology is to be advanced only by studying in details the effects on the atmosphere of insolation, radiation, the diurnal rotation and annual revolution of the earth, and the presence of continents and oceans.

RICE INDUSTRY IN BRITISH GUIANA.

In the course of an interview reported in the Demerara *Argosy* of April 6, Mr. T. E. Tinne, of the firm of Sandbach, Parker and Co., made the following reference to the rice industry:—

I have also been impressed by the enormous extension of rice cultivation. In the not far distant future, we should be able not only to raise all the rice required for our own consumption, but to be exporters of rice to other countries. We have got the front of Leonora—some 300 acres—planted in rice. All the land we could spare we gave out to the coolies to encourage them to settle on the property, and we are finding the policy is sound.

WEST INDIAN FRUIT.

THE MANGO IN JAMAICA.

The Jamaica *Leader* of March 25 has the following interesting note on the history of the mango in that island :—

The plants found on board the vessel captured by Lord Rodney were lodged in a garden near Gordon Town, and twelve years afterwards, in 1794, an advertisement appeared in the *Royal Gazette* offering eighteen plants for distribution, six for each county. This was the nucleus of its cultivation in Jamaica, and such a congenial home did the mango find here, that thirty-two years after it was introduced it was described as being 'one of the commonest fruit trees, in a great number of varieties.' The next time that we find 'new blood' brought in is in 1869, when Sir John Peter Grant imported from India two cases of grafted mangos, the first containing six varieties, the second twelve. Among these was the famous 'Bombay.' After this the number of fresh varieties introduced quickly increased in number, and in the succeeding years, up to 1901, young imported plants have been grown in the island, and swelled the numbers of this delicious fruit. In conclusion, a few words about the king of mangos, the No. 11, may not be uninteresting. According to one account it was the first that came into the island, the plants on the captured French vessel all being numbered—No. 11 being the famous variety. It has, however, been also said that the numbering took place many years later, when the different kinds of mangos then in Jamaica were thus enumerated to distinguish them one from the other.

SELECTION OF FRUIT FOR EXPORT.

In a leading article entitled 'Some plain words to our banana planters,' the Jamaica *Daily Telegraph* of April 5 mentions that the last Direct Line Steamer had taken a cargo of nearly 2,000 bunches of bananas—the first shipment since the hurricane of August last. In connexion with this shipment, it is stated, an important fact is to be noticed, viz., the large number of rejections. This, of course, was due to the temptation of growers, particularly those with only a few acres who must have been suffering keenly from lack of money, to ship as much fruit as possible regardless of its suitability, or otherwise, for the market. The article continues :—

'When will our planters learn to be wise? Had the rejected bunches only been allowed to remain on the trees two or three weeks longer they would have been fit for shipment, and would almost certainly have been purchased by the representatives of Messrs. Elders and Fyffes, Ltd., or the United Fruit Co. As it was, they were not purchased; and the growers were the losers. We should like to see our banana planters acting in a manner which would show that they possess a real grasp of the existing situation. The United Fruit Co. and Messrs. Elders and Fyffes, Ltd., are not going to buy fruit which they will not be able to sell when they land it in America or England. Is not that fact self-evident? If so, why court disaster by cutting fruit which is sure to be rejected?'

COCOA-NUT CULTIVATION IN THE PHILIPPINES.

The Bureau of Agriculture of the Philippines has recently issued a Bulletin on cocoa-nut cultivation. The Bulletin deals with the history and botany of the cocoa-nut palm, the uses of the various products and the methods of cultivation, including the treatment of insect pests and the renovation of old groves. The following is a summary of the conclusions arrived at by the author (Mr. W. S. Lyon, Officer-in-charge of the Division of Plant Industry) :—

The present conditions present especially flattering attractions to cocoa-nut growers capable of undertaking the cultivation upon a scale of some magnitude. By co-operation, small estates could combine in the common ownership of machinery, whereby the products of the groves could be converted into more profitable substances than copra.

The present production of copra is an assurance of a sufficient supply to warrant the erection of a high-class modern plant for the manufacture of the ultimate (the 'butter') products of the nut. The products of such an enterprise would be increased by the certainty of a local market in the Philippines for some part of the output. The average market value of the best grades of copra in the Marseilles market is $54·40, gold, per English ton.

The minimum size of a plantation, on which economical application of oil and fibre-preparing machinery could be made, is 60 hectares [148·26 acres].

The natural enemies and diseases of the plant are relatively few, easily held in check by vigilance and the exercise of competent business management.

In view of an ever-expanding demand for cocoa-nut products, and in the light of the foregoing conclusions, the industry, when prosecuted upon a considerable scale and subject to the requirements previously set forth, promises for many years to be one of the most profitable and desirable enterprises which command the attention of the Filipino planter.

COTTON NOTES.

Now that the returns of sales of West Indian cotton are coming in, interest in the industry is generally increasing.

There is no doubt about the quality of the best Sea Island cotton produced in these colonies. What is important is to make sure that *all* the cotton to be shipped next year will be uniform and of the best quality.

It may be mentioned that sufficient selected cotton seed to plant, altogether, about 7,000, acres is now in course of being distributed by the Imperial Department of Agriculture. If all this seed were carefully planted and looked after, the Sea Island cotton industry in the West Indies would be well established on a large scale.

A good many people will probably plant cotton without being fully acquainted with the conditions necessary for success. These simply court failure and loss, and will only have themselves to thank for taking up an industry they do not understand.

There are several publications that have been issued during the last twelve months by the Imperial Department of Agriculture giving simple and clear directions in regard to cotton planting ; and, besides, there are officers stationed in each colony who are always prepared to advise and assist cultivators.

To prevent disappointment it is advised that persons, who, hitherto, have had no experience in planting and are without means, should not start cotton growing. It is well known that starting a new industry like cotton requires a sound knowledge of planting and constant personal attention, or it is sure to fail.

To make cotton growing a success it would be useful if, in each locality, a few really earnest and painstaking people would start the cultivation, after they have fully realized the difficulties that have to be overcome. Their example and experience would be more valuable than piles of literature.

It has been suggested that the Board of Agriculture in British Guiana and Jamaica, and the Agricultural Society at Trinidad might greatly assist by starting ten or a dozen experiment plots (about one or two acres each) in different portions of these colonies, place them under experienced men and, if necessary, pay all expenses on condition that returns are presented at the end of the season showing exactly the details of expenditure and the gross receipts in each case. Ten such trial plots, at £5 each, would cost £50.

Such a course would at once place the experiments on such a footing that the results would be immediately available and a large amount of time and money would be saved. It would, also, enable members of the mercantile community to form their own estimate of the probable value of the new cotton industry as compared with other industries.

Where cotton has already been tried and failed, on account of disease, there should be an entire destruction of all old cotton plants by burning: that is the first requisite. After that the new cultivation should be *in fresh land with fresh seed*—care being taken that the soil is well prepared and manured beforehand.

We learn that at Montserrat the cotton growers, at a public meeting, have resolved to carry out fully the above recommendations. It is well known that they have hitherto experienced many drawbacks ; but they now hope to make a fresh start and overcome some, if not all, of their difficulties.

It should be remembered that weak and badly nourished plants are more liable to disease than strong and vigorous plants. Hence the necessity for choosing good soil ; or, if the soil is not good, of giving it extra cultivation and plenty of manure.

It is observed that at Jamaica, after some delay, it is proposed to go in for cotton cultivation on a large scale. This involves some risk, and especially if the growers are not fully informed as to the need for selecting good soil and carefully looking after every detail whilst the crop is growing. Also, in making due provision to meet the attacks of the cotton worm. A good stock of Paris green and powdered lime should, if possible, be secured before or as soon as the seed is planted.

It is also proposed at Jamaica to begin planting cotton in April. This may answer in some districts where there are rains in May and June ; but in others, especially where trial plots are proposed to be assisted by the Board of Agriculture, it might be advisable to plant at intervals later in the year in order to determine the best planting season for each district by actual experiment.

As a final word it is advised that those who are desirous of making themselves thoroughly acquainted with the details of planting Sea Island cotton in the West Indies should obtain a copy of the *West Indian Bulletin* (Vol. IV, no. 4) and carefully study it. This publication is obtainable (price 6*d.*, post free 8*d.*) from Agents in all parts of the West Indies. Also in London, from Dulau & Co., 37, Soho Square, W.; and at the rooms of the West India Committee, 16, Seething Lane, E.C.

Sales of Montserrat Sea Island Cotton.

From the account sales of a Montserrat cotton grower we learn the following satisfactory results of recent sales of Sea Island cotton shipped to England from that island :—

From the sale of 499 lb. in July 1903, the net proceeds were £16 5*s.* 4*d.* In November 1903, 319 lb. were sold at 8½*d.* per lb. ; the net proceeds of this sale were £11 2*s.* Lots of 35 lb. and 40 lb. sold at 5¼*d.* and 4½*d.* respectively, and netted 15*s.* in each case.

In January of this year, 1,955 lb. were sold at different times at 1*s.* 2*d.* per lb. After deducting charges for freight, insurance, brokerage, etc., the sum of £107 6*s.* was paid to the shipper.

Selection of Cotton Seed.

The following extract is taken from a letter, dated March 29, received from the Secretary of the British Cotton Growing Association :—

The bulk of the cotton from Barbados is turning out very well, but you must impress on all the growers the necessity for *very careful selection of seed* and extreme care in cultivation and handling, as unless Sea Island cotton is quite right in all respects, it suffers severely in price.

THE UTILITY OF FORESTS.

The following short statement of the uses of forests, which originally appeared in the Boston *Transcript*, is taken from the Barbados *Daily News*:—

Let us take two hillsides of identical slope and exposure, one being forested, the other cleared. The rain falls on the canopy of trees in the one instance and drips softly from leaves and branches and trickles down the trunks. The soil beneath is soft and loose (even in winter it does not freeze hard), a composition of disintegrated rock, decaying leaves and twigs and even logs, and all tied together by a dense mass of roots and rootlets. The rain comes upon this forest soil so softly through the trees that the ground is not compacted and hardened or gullied as it would be if the rain fell directly on the soil.

The loose and spongy earth takes up the water as fast as it falls, and that which is not seized by the roots for the nourishment of the trees is carried away into underground basins, from which it slowly percolates and eventually comes out upon the surface again as springs. So slowly does this filtering go on, the spongy soil holding the water back, that the springs are given a constant and almost steady supply. Even a drought will actually dry up but few such. Snows also melt more slowly in the forest, thereby preventing disastrous spring freshets.

In the other case, that of the treeless slope, the rain falls directly on the bare ground and pounds it hard and impervious. The water for the most part runs off superficially as from a roof. Not enough water sinks into the ground to help feed a constant spring. The surface run-off of a hard rain on a bare hillside is moreover conducive to gullying and washing of a most destructive nature, and the waters being poured immediately into the stream beds cause freshets. The freshet waters quickly rush by, wreaking havoc with fields, bridges and mills, and the next week the streams are nearly run dry.

FIBRE PLANTS IN MEXICO.

The following interesting account of the fibre industry of Mexico is taken from the *Consular Report on Mexico* for 1902:—

Another branch which is also a very important one, and which, on account of the small amount of care required, is extending very rapidly, is the cultivation and exportation of fibres. Mexico is rich in plants which would give very good and strong fibres, if they were only carefully attended to. At present the only fibres that are of any importance and receive any kind of care are henequen, ixtle and the broom root. The first is extensively cultivated in the State of Yucatan, and the exports are made through the ports on that coast, principally, if not entirely, through the port of Progreso, whence it is carried by vessels belonging to a company formed for the special purpose of conveying it to New York, which acts as the principal distributing centre. Ixtle is grown in the more northerly States on the Gulf of Mexico, but especially so in the States of Vera Cruz and Tamaulipas, finding an easy outlet through the two principal ports of Mexico, namely, Vera Cruz and Tampico. Broom root is found in more or less commonly throughout the republic, but it is not cultivated.

The total exports of fibres of all kinds in the year 1902 amounted to 105,913 tons, of which 88,087 tons were henequen (85,691 tons in the rough, and 2,395 tons in manufactured articles, principally hammocks and cordage), and the remainder consisted of 14,055 tons of ixtle (14,036 tons in the rough, and only 19 tons of manufactured articles, cordage, etc.), and 3,771 tons of broom root. The value of these exports, as given in the official returns, was £3,277,501, as compared with 103,518 tons of fibres valued at £2,438,979 in the year 1901. The values of the different fibres exported during the year were £2,946,900 for henequen, as against £204,700 for ixtle and £125,900 for broom root. The price of henequen on January 1, 1902, on the New York market, the principal consumer of this fibre, was 8¾c., gold, a price which was maintained without any marked change throughout the year. The broom root exported during the year was sent almost entirely to Belgium, while the ixtle found its way to the United States, the United Kingdom and Germany.

MR. POWELL IN BRITISH EAST AFRICA.

Mr. Henry Powell, formerly Curator of the Botanic Station at St. Vincent, and now Assistant in the Agricultural Department in the British East Africa Protectorate, writes as follows:—

The voyage out from England to Mombasa was intensely interesting. At Zanzibar, I met Dr. MacDonald, of St. Vincent, who took me to a fruit plantation in the island. At Pemba, I landed at two places and saw magnificent clove and cocoa-nut plantations.

My headquarters in British East Africa are at Nairobi which is also the headquarters of the Uganda Railway, and where everything in connexion with the line is now built and repaired. Nairobi is 5,450 feet above sea-level and is distant from Mombasa by rail 328 miles. I regard the climate at Nairobi as unique. We are now in the hot and dry season and the temperature ranges from about 80° F. in the shade by day to 50° F. in the early morning. There are no mosquitos, no fever, no excessive perspiration even when hard at work, and as a result Europeans enjoy as good health here as in any part of Europe. English vegetables of nearly all kinds and flowers thrive admirably.

The Agricultural Department here has only recently been established and we are all busy getting things into shape. At Nairobi we have an Experimental Farm with pedigree stock, including a Polled Angus bull, Muscat donkey, Irish Conemara stallion, fowls, ducks, etc. The crops under trial include wheat, oats, barley, flax, lentils, clover, fenugreek, maize, lucerne, beans, cotton, etc., and it is amazing how well the majority succeed. The sugar-cane also does well here, so that the immense range of cultivations can be understood. Most excellent butter is made and dairying is on the increase, the milk being much richer than in the West Indies. Large numbers of settlers are constantly arriving from South Africa and other places, and immense tracts of land are being taken up. Ramie and other fibres are being grown and settlers are anxious to grow the former on extended areas.

At Naivasha, about 60 miles from here, we have a large pedigree stock farm and the work of the Agricultural Department extends over many thousands of square miles.

We have the services of a cotton expert from Egypt who is now touring the country, coastwards, selecting land for, and starting, experiments. I am following and shall continue to follow with the greatest interest the results of the experiments in St. Vincent, and I am convinced that the cotton industry there will prove a success.

I am much indebted to you for causing the *Agricultural News* and other publications to be sent me, and I can assure you that I continue to take the greatest interest in the work of your Department.

SCIENCE NOTES.

A Shade Tree for Cacao.

The 'Madera' shade tree of Nicaragua (*Gliricidia maculata*) is reported by Mr. Broadway to be now in flower at the Grenada Botanic Station ; this is the second time this tree has flowered since it was introduced to Grenada from the Botanic Gardens at Trinidad. There are a number of these trees in the gardens at King's House in Jamaica. The 'Madera' shade tree is also now flowering at Chelston, Barbados, where it is regularly frequented by a large number of humming birds. It is worth cultivating for these alone.

Gliricidia maculata, which belongs to the natural order *Leguminosae*, has flowers of a light-purplish colour borne along the branches for 18 inches or more.

Mr. Hart states in the Trinidad *Bulletin of Miscellaneous Information* (September 1893) that this is the tree in general use in Nicaragua as a shade for cacao : 'The plantation is formed, and the "Madera," or permanent shade, is planted from seed in straight lines, about 5 varas apart, which would be equal to about 13 English feet. After allowing the shade to grow for from eighteen months to two years, the cacao trees are planted in the same lines as the shade trees and alternating with them in the rows at about 12 or 13 feet apart or less. The "Madera" becomes the permanent shade of the plantation.'

Insect-attacking Fungi.

Fungi, in so far as they concern the agriculturist, are often looked upon as a group, every member of which is either harmful or certainly not beneficial. There is, however, a group of fungi the members of which are distinctly friends of the agriculturist ; this group includes those fungi which are parasitic upon insects.

One of the most noted of these fungi is the so-called 'South African locust fungus' (*Mucor exitiosus*), which has been largely used in South Africa for the destruction of the locust. Other fungi are known to be parasitic upon scale insects in the West Indies and elsewhere, and Mr. Ballou has expressed the opinion (*Agricultural News*, Vol. II, p. 232) that some of these fungi do a considerable amount of damage to the scales. House-flies often suffer severely from the attacks of the fly fungus (*Empusa*) while chinch bugs are attacked by a fungus, *Sporotrichum*, which often destroys large numbers of these pests.

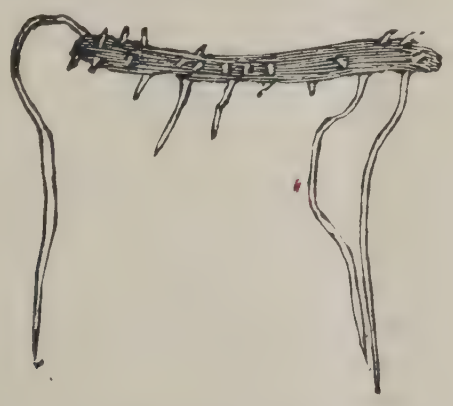


Fig 7. Larva of *Diatræa saccharalis* killed by *Cordyceps Barberi*.

Among the most interesting of these fungi are a number of species of the genus *Cordyceps* belonging to the Ascomycetes. The genus is world-wide in its distribution and most of the species live upon caterpillars and grubs of various kinds ; *Cordyceps Barberi* (Fig. 7) is parasitic upon the larva of the moth-borer of the sugar-cane.

When a spore of *Cordyceps* falls upon the body of a living grub it puts out a short germ-tube or hypha, which bores through the skin of the host and then branches. The hyphae penetrate further into the inner tissues of the grub. Next these hyphae, inside the host, begin to produce spores (conidia) ; these conidia get into the blood and then commence budding in a similar manner to that described for the yeast plant (*Agricultural News*, Vol. III, p. 123). The budding proceeds rapidly, and the spores so produced are carried in the blood to all parts of the animal, which then dies.

The spores now put out hyphae which branch and grow through the tissues of the grub, which they consume and replace. Finally, what appears to be the insect body is simply a mass of very thickly interwoven hyphae of *Cordyceps*. The hyphal mass or *sclerotium*, however, still retains the external form of the grub.

Later on, the fungus begins to produce spores. Thickly woven masses of hyphae break out from the sclerotium and grow up into the air to form club-shaped bodies with a stalk and head. The illustration shows these, in various stages, growing from all parts of the sclerotium. When ripe, the head is seen studded with numerous minute pores : these pores are the openings of flask-shaped chambers in which the spores are produced. In each flask numerous long, narrow *asci* are formed, and in each of these eight thread-like ascospores are formed. Before the ascospores are liberated, they break up into very numerous small spores, which escape through the pore of the flask into the outer air.

A few species of this genus are parasitic upon other fungi, the truffles and their allies. One of these, *Cordyceps ophioglossoides*, is found in England, growing upon a fungus, *Elaphomyces*, which in turn grows upon the roots of pine trees.

Resurrection Plants.

Three different plants are known under the above name, says Mr. A. Hemsley in the *Garden*. *Mesembryanthemum Tripolium* is one of the most remarkable. When dry, the seed capsules are tightly closed up and when soaked in water the capsules will open out their curious valves. On being dried they will close, but will open again with moisture. This may be repeated several times without destroying the remarkable hygroscopic properties. The seed vessels or capsules of many other plants possess the same properties, and it is chiefly those which grow in countries or districts where they have long dry seasons. The seeds which ripen during the early part of the dry season, remain on the ground for a considerable time, and are protected by the folding up of the capsules. When the rain comes these coverings open and allow the seed to escape during the time the ground is most suited for their germination. *Anastatica hierachuntica* is another known as the Resurrection plant. It is a curious little annual belonging to the *Cruciferae*. The third known as the Resurrection plant is *Selaginella lepidophylla*, a club moss, which, after being dried up, will again assume its natural appearance. On this account it is often sold as a vegetable curiosity. (*Indian Planting and Gardening*, February 6, 1904.)

Goats at Malta. Milch cows are few in number nearly all the fresh milk being furnished by the goat, which is of a good breed, the best specimens being able to furnish on an average from 5 to 6 pints per diem. The milk derived from sheep is all turned into cheese. (*C.O. Report*, 1902-3.)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 143 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, APRIL 23, 1904. No. 53.

NOTES AND COMMENTS.

West Indian Bulletin.

It is desirable to mention that the supply of the *West Indian Bulletin* (Vol. IV, no. 3), containing general information respecting the cultivation of cotton and other matters, is now exhausted and further copies cannot be supplied.

The Department is desirous of obtaining clean copies of this number. Any persons having them for disposal might communicate with the local agents of the Department, who are authorized to pay 3*d.* per copy.

Copies of the *West Indian Bulletin* (Vol. IV, no. 4), containing later information embodied in a Report by Sir Daniel Morris and Mr. J. R. Bovell on Sea Island cotton in the United States and the West Indies, are still available and may be obtained from all Agents (price 6*d.*, free by post 8*d.*).

Shipments of Cotton from Barbados.

During the current season Mr. Bovell reports that, according to returns furnished by the Comptroller of Customs at Barbados, there have been shipped, up to March 31 last, 244 bales and 2 bags of cotton, containing 61,000 lb., of the estimated value of £3,050. The Central Factory shipped 135 bales of Sea Island cotton, 21 bales of Egyptian cotton, 1 bale of Upland, and 2 bags of cotton from native plants. Others shipped 82 bales of Sea Island cotton and 5 bales of Egyptian. This is interesting as a record of the first shipment of cotton from Barbados on a commercial scale probably for forty years.

Leeward Islands Sugar-cane Experiments.

Part II of the Report on the Sugar-cane experiments conducted in the Leeward Islands in the season 1902-3, under the direction of the Imperial Department of Agriculture, has recently been issued.

The price of the Report has been fixed at 1*s.* for each part or 2*s.* per set. This publication may be obtained of all agents of the Department.

Exports of Barbados.

We extract the following figures relating to the exports of Barbados for 1903 from a statement in the *Official Gazette* of March 31, 1904:—

Sheep, goats and swine, 720, valued at £601; butter, 741 lb., valued at £25; fruit and vegetables to the value of £7,099; hides, £569; ice, £218; building lime, £1,547; manjak, 650 tons, valued at £6,508; molasses, 30,344 puncheons, valued at £136,548; muscovado sugar, 35,170 hogsheads, valued at £232,122; dry sugar, 3,453 hogsheads, valued at £27,624; and tamarinds, 866 barrels of the value of £866.

The following items might also be mentioned as some of them occur now for the first time:—prepared cacao, £10; raw cotton, 550 lb., valued at £28; cotton seed, 3,700 lb., valued at £13; cured fish, £5; Barbados petroleum, £18; salted and pickled pork, 200 lb., valued at £4; succades, £240; and tar, £45.

The United States Cotton Crop.

Frequent references have been made in the United States press to the anticipated results of the recent rise in the price of cotton, and to the speculations of the great dealers in this commodity. The New York *Times* of March 19 draws attention to the failure of the attempt to create a corner in cotton, taking advantage of the fact that the cotton yield of the United States was below the normal requirements of the world.

Referring to the same subject, the Barbados *Advocate* of April 7 points out that, in spite of the repeated warnings of the press and the United States Department of Agriculture to farmers not to increase their sowings, it appears that the average increase throughout the whole cotton-producing area is about 30 per cent. Such an increase would naturally have the effect of lowering the prices to a considerable extent, notwithstanding the ever-increasing demand for cotton.

This fact need not, however, discourage West Indian planters from increasing their sowings of Sea Island cotton, for, as stated by the *Advocate*:—

> Sea Island cotton, which is the variety indigenous to the West Indies will be little, if at all, affected by the increased acreage here referred to. So that planters who are proposing to go in for cotton cultivation on any scale need not be deterred from doing so. The area suited for the cultivation of this variety in the United States cannot be indefinitely enlarged. It is, in fact, already fully appropriated. Hence the high market value, which the Sea Island cotton has attained on account of the length and quality of the fibre which make it adapted to uses to which other kinds are not suited is not likely to suffer any considerable decline.

Cassava Starch in Jamaica.

References have already been made in the *Agricultural News* (Vol. III, pp. 44, 105 and 118) to the efforts that are being made in Jamaica to establish an export business in cassava starch, and more particularly to the trial shipment that had been made by Mr. J. W. Middleton, who had started a factory for the manufacture of this starch at Longville, Clarendon.

The Jamaica *Daily Telegraph* of March 26, 1904, states: 'Mr. J. W. Middleton has just received a cable report from Manchester on the result of the tests to which the cassava starch made at his factory has been subjected. The results of the trial have been very satisfactory, and he has been asked to send at the earliest opportunity 50 tons, for which a price of £10 per ton in Bristol is offered.'

Commenting on this report the same journal remarks that it is conclusively shown that there is a bright future for the cassava starch industry, for, considering the cheapness with which cassava can be grown and the moderate cost at which the starch can be manufactured, there is money in the new venture.

It is stated that the manufacturer has succeeded in making a starch to suit the finishers of high-class goods in Manchester, who at present use, for their finer processes, wheat starch which costs, on an average, £27 per ton.

'The cultivation at Longville consists of about 50 acres, which will be ready for starch making this season. The capacity of the plant is about 150 tons per annum.'

Cassava Starch.

Referring some months ago to the experimental shipment of cassava starch from Jamaica, the result of which is given elsewhere in this issue, the Jamaica *Times* stated: 'Ladies complain bitterly of the damage done to clothes by the acid in cassava starch as it is often put on the market here.' We find that there appears to be a general belief in that direction throughout the West Indies: it is particularly prevalent, we are informed, in Barbados.

With a view to obtaining further information on this point, a sample of Barbados cassava starch was, at the request of the Imperial Commissioner of Agriculture, forwarded to Professor d'Albuquerque for examination as to its freedom, or otherwise, from acid.

Professor d'Albuquerque reported: 'The acidity of this sample by ordinary tests is imperceptible. . . . This sample of cassava starch, in respect to freedom from acidity, compares very favourably with the best obtainable sample of arrowroot starch.'

With reference to the general characters of cassava starch for laundry purposes, the following report from a laundry in England is of interest:—

I have tried the sample of starch you sent me both boiled and unboiled. One table-spoonful of your starch is equal to two of mine; it is very glutinous. The cold starch, when used with borax, is certainly stronger than the starch I have been using, but it is inclined to stick to the iron and on the outside of the collars, etc. The starch is a good colour. It could be used for starching without borax, as it is very stiff and *also gives a gloss.*

Trade and Agriculture of St. Lucia.

The *Colonial Report on St. Lucia* for the year 1902 contains a number of interesting facts relating to the trade and agriculture of the colony. Although there is a considerable decline in the total value of the exports, this is mainly due to a falling off in the export of coal. The exports of sugar and sugar products also show a decline in value, but we are glad to notice that the steady increase in the export of cacao has been maintained. It is interesting to note that pimento sticks figure quite largely in the table of exports: 15,996 were exported during the year, their value being estimated at £446.

Reference is made in this report to the work of the Agricultural Department, especially to that of the Botanic Station in distributing plants, and that of the Agricultural Instructor in advising planters on the preparation of produce for market and agricultural matters generally.

The Production and Consumption of Cacao.

The *Tropical Agriculturist* of March 1, 1904, publishes a report by Messrs. Lewis and Noyes on the above subject.

In a list of the quantities of cacao (in bags) produced, during the last five years, in the various cacao-growing countries, it is shown that the principal producers in 1902 were: Guayaquil (467,000), Africa (297,504), Bahia (273,977), Trinidad (166,788), Venezuela (166,000), Grenada (61,279), Ceylon (60,455), Para (49,840), and Africa, British, (47,900). The production in Jamaica was 17,620 bags; the returns for Mexico were not complete, but the production in 1901 was 35,859 bags.

There has been an important increase in the production of cacao in all countries except Surinam, Java, Hayti and San Domingo. In Surinam the decrease is due to the inroads of the 'Witch Broom' disease; in Java to adverse climatic conditions, and in Hayti and San Domingo to political disturbances. On the other hand, the industry has made great strides in our West African possessions (where every assistance is being given by the authorities), as will be seen from the following figures showing the production: 1898 (787), 1899 (4,787), 1900 (9,047), 1901 (16,170), and 1902 (47,900). It would appear that there is likely to be considerable increase in the production of this article in the Congo, in Costa Rica, and also in Java and Ceylon.

'The consumption appears to be growing steadily, and we see no reason why this healthy condition should not continue, when we take into consideration the many forms of manufacture from the raw state, and its growing recognition as a nutritious article of diet both in this and in other countries. The consumption of the world is estimated to be, for 1902, about 120,000 tons.'

A table, giving the comparative prices for the cacao exported from different countries, shows that the highest prices were obtained in 1903 for that from Guayaquil (65*s.* to 80*s.*), Trinidad (64*s.* to 75*s.*), and Grenada (51*s.* to 62*s.*).

INSECT NOTES.

The Fumigation of Imported Plants.

The necessity for adopting preventive measures against the introduction of insect pests has already been dealt with in the *Agricultural News* (Vol. III, p. 74). In that article it was mentioned that Jamaica had for some time been enforcing the fumigation of imported plants and that British Guiana had recently enacted a law for the same purpose.

Of the Lesser Antilles, Dominica is the first to make a positive start in this matter. Fumigating chambers have been built and materials for fumigating have been procured. The fumigating chambers are of two sizes—one, 8 feet by 6 feet by 6 feet inside, and the other 2 feet by 2 feet by $2\frac{1}{2}$ feet. They are built of matched $\frac{7}{8}$-inch pine (deal) boards, double boarded with a sheet of building paper between, and made as nearly air-tight as possible.

The fumigation is accomplished by means of hydrocyanic acid gas. This is produced by the addition of potassium cyanide to a mixture of sulphuric acid and water. The cyanide should be 'miner's fused', of a strength of 98 to 99 per cent., and the sulphuric acid, a good grade of commercial acid, with a specific gravity of not less than 1·83.

For use in a box or chamber 1 oz. of cyanide should be used for each 300 feet (cubic content), and for generating the gas a vessel of wood, glass or earthenware, but never metal. The amount of acid should be one and a half times the amount of cyanide and that of water one and a half times as much as of acid. The amounts for the large fumigating chamber mentioned above would then be : cyanide, 1 oz.; acid, $1\frac{1}{2}$ oz. ; water, $2\frac{1}{4}$ oz. ; and for the smaller box, cyanide, 1 gramme ; acid, $1\frac{1}{2}$ cc. ; water, $2\frac{1}{4}$ cc.

An arrangement should be made so that after the mixture of acid and water is placed in the generating vessel, the cyanide, loosely wrapped in soft paper, can be added, after all doors, etc., are closed. This is accomplished by means of a string through a hole in the side of the chamber. The plants or fruits are put in place, the water and acid in the generator and the charge of cyanide suspended above the generator by the string. When all is securely closed, the cyanide is lowered into the generator, and the small hole through which the string passes closed by means of a cork or wooden plug. When the cyanide is dropped into the acid and water, a violent bubbling takes place and a cloud of steam is given off ; this steam is mixed with the poisonous hydrocyanic gas, which continues to be given off till the cyanide is used up.

As hydrocyanic gas is extremely poisonous, the greatest care is necessary on the part of the operators not to breathe it. It is nearly colourless, with a strong odour of burnt almonds, which is easily detected by one familiar with it, even when present in small quantity.

For ordinary plants, the time required in fumigating is one hour, but more tender plants may be exposed for a shorter time, or the amount of the material used may be decreased. At the end of the required time, the doors and ventilators should be opened and the fumigating chamber allowed to become free from the gas. Not less than fifteen minutes should be allowed to pass before anyone should enter or breathe the air at the door or window.

The Mealie Grub.

The *Transvaal Agricultural Journal* for January 1904 contains an interesting article on the Mealie Grub (*Sesamia fusca*). The insect is one of the Noctuid moths and its habit of feeding in the mealie (maize) plant is very similar to the habit of the Moth-borer of the Sugar-cane (*Diatræa saccharalis*) of the West Indies.

The eggs are laid on the leaf and the young caterpillar works its way down into the heart and stem of the plant, seriously injuring or killing the plant.

The remedies suggested are—(1) Taking out the affected plants and destroying them ; (2) rotation of crops ; (3) late planting ; and (4) fall ploughing or burning of stalks.

It may be of interest to note that the Mealie Grub of the Transvaal is the Sugar-cane borer of Mauritius, while the Moth-borer of the sugar-cane in the West Indies is known in the United States and other places as the Larger Corn-stalk borer.

LEEWARD ISLANDS: REPORT ON SUGAR-CANE EXPERIMENTS, 1902-3. Part II. By Francis Watts, B.Sc., F.I.C., F.C.S., Government Analytical and Agricultural Chemist. Price 1*s*.

This part of the report deals with the experiments that have been carried out during the year in the Leeward Islands to ascertain the manurial requirements of the sugar-cane.

It is proved that the use of artificial manures is not remunerative with plant canes, the use of pen manure and the proper preparation of the land being all that is necessary to give maximum crops : with ratoons, on the other hand, artificial manures are decidedly remunerative. For these nitrogen, in a rapidly acting form, must be used. The experiments also bring out the desirability of applying the nitrogen in one dose rather than in divided doses.

An appendix to this report deals with the relationship between the tonnage of cane and the pounds of sucrose in the juice—a question of great importance in connexion with experiments of this nature. Mr. Watts states : 'It is probable that we shall in the future make our comparisons in manurial experiments on the basis of tons of canes, rather than of pounds of sucrose.'

LECTURES ON AGRICULTURAL SCIENCE: By Longfield Smith, B.Sc. (Edin.), Ph.D. (Leipzig), Lecturer in Agricultural Science at Barbados. Price 3*d*.

This is a summary of the lectures that were delivered by Dr. Longfield Smith at Barbados in 1902 and 1903 and in Bermuda in 1904. In these lectures a wide range is covered, as elementary facts in chemistry, physics and biology, directly or indirectly connected with agriculture, are discussed.

This publication is likely to be of considerable use to officers of the Department and others in connexion with lectures to teachers.

TROPICAL DISEASES AND THEIR CAUSES.

The following is an extract from the lecture on 'The Disease Problem of the West Indies,' delivered by Sir Patrick Manson, K.C.M.G., M.D., F.R.S., at the West India Committee Rooms on March 8. We propose to publish further extracts from this valuable lecture in future issues of the *Agricultural News*. The present extract deals particularly with the causes of certain tropical diseases :—

Our knowledge of the cause of malaria and of the means by which it is disseminated is even more precise. We know that what we call malaria is a minute animal which lives in the blood of man. Each blood corpuscle occupied by the growing parasite is destroyed. When the corpuscles so invaded break up and liberate the little groups of young parasites into which the full grown parasites divide, the characteristic fever is produced. Generation of parasites follows generation, and in a very short time, in consequence of the destruction of many blood corpuscles, the patient is brought to a condition of profound anæmia, even if he does not die of the disease. Under the most favourable circumstances he is unfitted for work for a longer or shorter time. If not properly treated, his fever spells may recur during several months or years, and all this time he is more or less of a burden to his friends or to the community. We know now that the malaria parasite is passed from the sick to the sound by a special kind of mosquito, and we also know that if this mosquito is prevented from biting the sick, or if it does chance to bite the sick, from subsequently biting the sound, there will be no spread of the infection.

We are not so sure about the germ cause or causes of the dysenteries and diarrhœas, but we are sure that most of these diseases are caused by germs conveyed from the sick to the sound, either in food or in water, or by direct contact with the discharges from diseased surfaces, and, further, that the growth of these germs and the diseases to which they give rise are specially favoured by unwholesome feeding. The influence of feeding in inducing these intestinal diseases is specially well illustrated by what happens in most negro nurseries. Writing in the sixth issue of that most instructive publication, the *British Guiana Medical Annual*, Dr. N. Barnes remarks: 'As regards feeding, the children of our populace must be ranged in two great classes. The Hindu coolies almost invariably nurse their children. With the negroes it is far different. Almost from the moment of birth the black baby is crammed with pap made of plantain, Indian corn meal, cassava starch, etc., sometimes even with soup made of salt meat or fish. When this diet causes dyspepsia, and the child, being in pain, begins to cry, the usual treatment is to fill it up with more pap until it is unable to cry.' Under such circumstances dysentery, or diarrhœa, or convulsions, are only to be expected. This grotesque system of infant feeding has much to do with the enormous infantile mortality so notorious among the negro races.

Crotons. A correspondent is anxious to obtain a plant or two of croton 'Princess of Wales.' Possibly some of our correspondents can inform him where these are available and the cost, packed ready for shipment.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture embarked in H.M.S. 'Pallas' for St. Lucia and Antigua on Monday, April 18. After completing his visit to Antigua it is probable that he will call at Dominica and St. Lucia and return by R.M.S. 'Eden' due at Barbados on the 23rd. instant.

AGRICULTURE IN NORTHERN NIGERIA.

In the *Colonial Report on Northern Nigeria* for 1902, the High Commissioner (Sir F. Lugard) makes the following remarks on the agriculture of the colony :—

Additional consignments of cotton seed have been received from England and distributed. Samples of indigenous cotton from each province have been sent to the British Cotton Growing Association, and also some samples of the cotton from the new seed, but as yet their report has not been received. I hear that the latter has been valued at the very high price of $6\frac{3}{4}d.$ per lb. It is under consideration to send a cotton expert to Northern Nigeria, as has been done to each of the other West African Colonies, to instruct the natives in the use of ginning and pressing apparatus, and report on the suitability of various districts and soils for cotton cultivation, and upon the prospects of the industry if taken seriously in hand. My own view is that imported products such as cacao, improved cotton, coffee, etc., should not be grown in plantations by Europeans, but introduced as a crop among the agricultural villages, and their cultivation promoted by a distribution of plants and seeds, and by a promise to buy the produce, and by bonuses for good results in order to naturalize them in the country. The extensive growth of the onion and leek throughout the Hausa States shows that the people readily adopt a new culture. It is necessary to establish nurseries of such plants for distribution, under the care of an expert Curator, and I think it would be most useful to place in the Government Gardens specimens of indigenous trees of economic value (e.g., the various rubber plants, wood-oil trees, gambia pod, etc.), so that residents and others on arrival could learn to recognize these, and promote their cultivation, and check their destruction in their provinces. It is, above all, important to teach the people the use of oxen in agriculture, and to introduce the American or Indian plough used by the Kaffirs of South Africa. It has been pointed out by many writers, that since throughout Africa oxen are only driven or tended by men, the introduction of ploughs has the result of emancipating the women to some extent from the labour of field work, and causes it to be undertaken by men. Men, however, already work in the fields throughout the greater part of Northern Nigeria.

Land Crabs. Mr. Henry Millen, Curator of the Tobago Botanic Station, writes that carbon bisulphide has been found useful for exterminating land crabs which abound in the Station. The following method has been found to give good results :—Cotton is placed in the holes to a distance of about a foot—large holes will require about a handfull. The cotton is then saturated with the carbon bisulphide, and the holes closed up. In these experiments it was found that a bottle of carbon bisulphide (sold locally at 1*s.* 8*d.*) was sufficient to destroy from twenty-five to thirty crabs.

GLEANINGS.

The St. Lucia *Voice* of March 31 congratulates the pupils and master of the Castries Boys' Primary School on the success of the recently established school garden.

There are a few vacancies for suitable pupils at the Agricultural School and Experiment Station at St. Lucia. Application for admission should be made as early as possible to the Curator of the Botanic Station.

Prices for copra are slightly easier, being $2·75 per 100 lb. We understand that practically all the cocoa-nuts in the island, for some months to come, have been engaged at very fair prices. (Trinidad *Mirror*, April 8.)

The St. Croix *Bulletin* states that the smaller planters on the contiguous estates have signed contracts to deliver cane to the Bethlehem Central Factory, the cane growers to receive 6 per cent. in sugar of the weight of the cane.

One hundred and ninety-one bunches of bananas, 10 crates of mangos, 12 bales and 3 bags of cotton and 12 bags of cotton seed, were shipped on the R.M.S. 'Orinoco' for Southampton.

It is stated in the *Sugar Planter's Journal* that a new use has been found for bagasse, viz., for the manufacture of cardboard. A company, known as the Fibre Board Company, has been formed for the purpose in Boston.

More cane sugar for refining purposes is reaching the United Kingdom than for years, and Liverpool seems to be getting the preference as the port of arrival. The heavy dock charges of London do not conduce to increasing supplies. (*International Sugar Journal.*)

American Gardening for February 20 has the following: 'Never plant seeds in dry soil, or in soil that is less moist than the seeds, as the drier soil will extract the moisture from the seeds and the germ will die. The finer soil particles are, whether for potting, the garden or the farm, the more their surface is increased for taking up and holding moisture, the greater the surface for root-hairs to work upon.'

In acknowledging the receipt of a copy of the *West Indian Bulletin* (Vol. 4, no. 4), Mr. W. A. Orton, of the Bureau of Plant Industry, U.S. Department of Agriculture, an eminent authority on the cultivation of Sea Island cotton in South Carolina, writes: 'This publication should prove of great value to your cotton planters, since, from its clear treatment of the culture of Sea Island cotton, it forms a very valuable addition to our cotton literature.'

Reports received from St. Vincent in respect of the working of the Central Cotton Factory are of a very satisfactory character. The machinery works smoothly and effectively and a large shipment of cotton is to be made by this mail.

Be sure to include ground nuts in your order for garden seeds. Half a gallon of seed will contain about 400 kernels, enough to plant 200 hills, which, with proper care, should yield 2 bushels. Ground nuts are as easily grown as Irish potatos, the method of culture being similar. (*Farm Journal.*)

A French patent for the production of a substitute for India-rubber has been taken out by Fayolle. The ingredients used are glycerin treated with sulphuric acid; afterwards formalin is added and later pure phenol. The new product is said to be suitable for use in rendering fabrics waterproof or as an electric insulator.

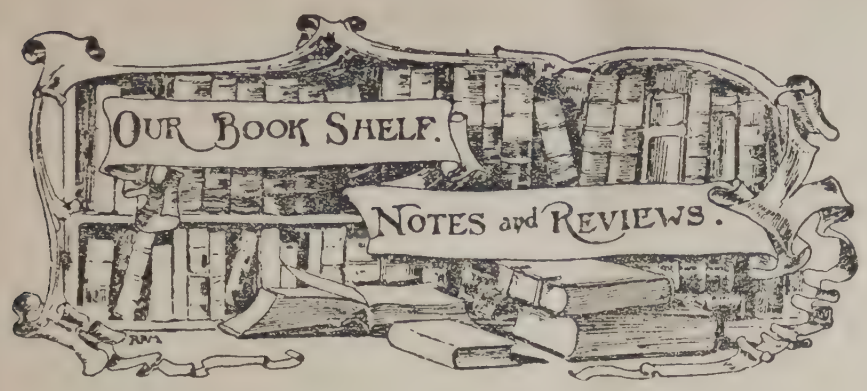
A lecture was recently delivered in Jamaica by the Hon. T. H. Sharp on the cotton industry. Mr. Sharp is reported by the *Daily Telegraph* of March 31 to have 'exhibited samples of the Sea Island and Upland cotton, and pointed out that, owing to the texture of the latter, it fetched a much larger price.' There is, of course, an error here, as it is the former, the Sea Island, that fetches the higher price.

Mr. W. E. Broadway reports that the yam and sweet potato crops were recently dug in the 'Food Index Plots' at the Grenada Botanic Station. Of the yams, the heaviest crops were yielded by the 'White Water' and 'St. Lucia' varieties, one tuber of the former variety weighing 23½ lb. In the sweet potato plot the best results were obtained from the 'Moko' variety, which is also the favourite variety with the people of the island.

According to the annual report of the Secretary of the Jamaica Agricultural Society, there are now forty-one affiliated branch societies with a total membership of 2,563. The Prize Holdings Competition scheme has been carried through with considerable success in the parishes of Hannover and Westmoreland. There were seventy-eight entries in the former parish and ninety-two in the latter. The judges expressed their gratification at the efforts of the competitors.

The Hill Garden at Curepipe, Mauritius, is chiefly for nursing plants that cannot be grown at the tropical garden at Pamplemousses owing to the climate. Large numbers of seedlings are raised yearly—*Juniperus*, *Pinus sinensis*, *Eucalyptus*—and are planted on Crown lands in different parts of the colony or sold to private persons for re-afforestation purposes. A Re-afforestation Ordinance has been passed, and arrangements under the advice of an expert forest officer of the Indian Forest Department are now being matured to give effect to it. (*C.O. Report*, 1902.)

It is officially stated that the United States Government spends six and a quarter million dollars (£1,250,000) in promoting its agricultural interests, while the several States and territories expend something over four and a half million dollars (£900,000) for a similar purpose. These make a total of ten and a quarter million dollars (£2,050,000) expended annually in advancing the interests of agriculture. It is added: 'this is certainly a most liberal figure and much more than is being expended by any other Government in the world for the same purpose.'



SECOND REPORT ON ECONOMIC ZOOLOGY. By F. V. Theobald. *London: Printed by order of the Trustees of the British Museum, 1904.*

This is next in series to the *First Report*, a notice of which will be found in the *Agricultural News*, Vol. II, p. 331, and deals with animals grouped and classified according to the place they hold, considered from the point of view of Economic Zoology.

Reports to the Board of Agriculture on Agricultural Zoology and answers to correspondents make up Part II. There is also a list of insect pests of Egypt, additional insect pests of the West Indies and *Coccidae* of Egypt, altogether making a valuable and interesting collection of information.

FARMERS' BULLETINS OF THE PHILIPPINE BUREAU OF AGRICULTURE.

We have received a number of Farmers' Bulletins issued by the Philippine Bureau of Agriculture. These publications are of the same character as the Farmers' Bulletins of the United States Department of Agriculture and are likely to be of the greatest value to planters in the Philippines.

Among the Bulletins already published may be mentioned: No. 1, 'A Primer on the cultivation of sugar-cane'; No. 2, 'Cacao culture in the Philippines'; No. 3, 'Modern rice culture'; No. 7, 'Report on the introduction and distribution of seeds and plants by the Bureau of Agriculture'; and No. 8, 'The cocoa-nut.'

In No. 1 it is stated: 'The present practices plainly indicate a lack of knowledge of certain fundamental principles in cane cultivation, and the purpose of this paper is to place before the cane grower, in compact form, the elementary information essential to the success which lies within his reach.' This quotation serves to indicate the general purpose and nature of the series.

COTTON CULTURE: By R. J. Redding. *Bulletin No. 63 of the Georgia State Experiment Station, 1903.*

This bulletin, which is written by the Director of the Georgia Experiment Station, is chiefly devoted to the field experiments that have been carried on in that Station. The following experiments are reported upon: (1) variety test, (2) 'composite' seed test (where an early and a late variety are planted together), (3) manurial experiments, (4) planting on bed or level.

In an appendix are given suggestions and manurial formulae based on carefully conducted experiments. The results of fourteen years' experiments appear to justify the drawing of certain conclusions as to the requirements of the cotton plant. Thus, the following rotation is recommended: 1st year, corn and peas; 2nd year, wheat and oats followed by cow peas for hay; 3rd year, cotton.

It must, of course, be understood that this bulletin deals entirely with Upland cotton and not with Sea Island cotton—the variety being grown in the West Indies.

EDUCATIONAL.

School Gardens and Arbor Day.

The following is taken from *American Gardening* of March 19, 1904:—

SCHOOL GARDENS.

School gardens continue to receive a constantly increasing share of public attention. From very many parts of the country reports reach us bearing witness to this widespread interest. There can be no question but that the movement should be encouraged by all who are in any way concerned in practical horticulture. If the younger generation has implanted in it an intelligent interest in garden routine work, together with an intelligent acquaintance with growing plants, there will not be the need of so much missionary work in garden art in the future as there has been in the past.

The school garden movement was started some eighty years ago, but its most rapid development has been within the last decade. Work in this country is not by any means sufficiently widespread. With a round 100,000 school gardens in Europe, is it any wonder that garden art has reached a wider distribution across the ocean than it has with us?

It is not at all necessary or desirable that all the school children should be made into gardeners, but the early teaching would raise the standard of those who adopt the calling and create a better appreciation of the craftman's skill in those who would depend upon the labour of others. From the standpoint of the trade, too, the increased interest in garden embellishment would stimulate a widespread and healthy demand for plants and seeds of high quality.

ARBOR DAY.

Very closely associated with the school garden movement is the Arbor Day celebration. Nearly every State now sets apart one day which is devoted to the planting of trees with more or less ceremony. True it is that a very large amount of the work involved is entirely spent and wasted energy. Too often, the planting is done in a perfunctory and haphazard manner, and the trees set out are left to care for themselves.

Planted and neglected, and allowed to die, whatever possible good may have been started in the minds of children is entirely counteracted. Some of the most interesting tree-planting exercises take place in connexion with the schools of densely populated cities. Usually, under such conditions, the park department (co-operating with the school system) supplies the trees to be planted, selects the locations, and attends to their subsequent needs. Where such planting has been done in small parks and city squares near schools, the children have begun to feel a personal interest in the growth of 'their' trees, and from this beginning a recognition of the purpose and value of parks can easily be traced.

All these movements which draw attention to the living plant and better citizenship should receive the heartiest support of the horticulturist.

In the West Indies the Imperial Department of Agriculture has devoted considerable attention to these matters. Every effort has been made to encourage the establishment of school gardens: at all the Agricultural Shows held under the auspices of the Department, special prizes have been offered for exhibits by the children attending elementary schools. Officers of the Department have also given every encouragement to the Arbor Day movement.

MARKET REPORTS.

London,—March 29, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', March 25, 1904; 'The West India Committee Circular,' March 29, 1904; and 'The Public Ledger,' March 26, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 21/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/7 per lb.
Balata—1/6 to 1/11 per lb.
Bees'-wax—£7 to £7 5*s.* per cwt.
Cacao—Trinidad, 60/- to 70/- per cwt.; Grenada, 52/- to 59/6 per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 60/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 39/- per cwt.
Copra—Trinidad, £16 5*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 1/4 per lb.
Divi Divi—No quotations.
Fruit—
Bananas—Jamaica, 5/- to 7/- per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 33/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/8 to 2/11; Cake, 1/1 to 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 10*d.* to 1*s.* 2*d.* per gallon; Concentrated, £12 to £12 15*s.* per cask of 108 gallons.
Lime Oil—No quotations.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/9 to 2/3 per lb.
Nitrate of Soda—Agricultural, £10 2*s.* 6*d.* per ton.
Nutmegs—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per lb.
Pimento—3¼*d.* to 3¾*d.* per lb.
Rum—Demerara, 7½*d.* to 9½*d.* per proof gallon; Jamaica, 1/4 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 1/- to 1/1 per lb.
Sugar—Crystallized, 14/6 to 16/- per cwt.; Muscovado, Barbados, 14/6 per cwt.
Sulphate of Ammonia—£12 12*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

Montreal,—March 9, 1904.—Mr. Alexander Wills.

Cocoa-nuts—Trinidad, $24·00; Jamaica, $24·27 per M.
Coffee—Jamaica, 8¼c. to 9½c. per lb.
Ginger—Jamaica, 6¾c. to 8c. per lb.
Molasses—Barbados, 31c. to 34c. per gallon.
Molascuit—Demerara, $1·32 per 100 lb.
Nutmegs—Grenadas, 110's, 20c. to 21½c. per lb.
Pimento—Jamaica, 8c. to 8¼c. per lb.
Sugar—Crystals, $2·09¼ per 100 lb. in bond.
—Molasses, $1·24 to $1·24¾ per 100 lb. in bond.

New York,—April 1, 1904.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—Caracas, 13c. to 14c.; Jamaica, 10½c. to 12½c.; Grenada, 12¾c. to 13c.; Trinidad, 12½c. to 14c. per lb.
Cocoa-nuts—Trinidads, $28 to $30; Jamaicas, $32 to $34 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7¼c. to 8c. per lb.
Ginger—Jamaica, 6¾c. to 7½c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Grape Fruit—No quotations.
Oranges—No quotations.
Pimento—7¾c. per lb.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3 5/32c. to 3 1/16c.; Muscovados, 89°, 3 5/32c. to 3 3/16c.; Molasses sugars, 89°, 2 23/32c. to 2 1/16c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 6, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—16c. per gallon (Imperial).
Sugar—$1·52½ per 100 lb.

Barbados,—April 9, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$12·00 to $12·75 per 100 lb.
Cocoa-nuts—$10·00 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $12·50; ordinary Rio, $12·00 per 100 lb.
Hay—95c. to 96c. per 100 lb.
Manures—Nitrate of soda, $60·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—14c. per gallon (puncheon included).
Onions—Madeira, $3·65; local, $3·00 per 100 lb.
Potatos, English—$1·60 to $2·16 per barrel.
Rice—Ballam, $4·75 per bag (190 lb.); Patna, $3·50 to $3·60 per 100 lb.
Sugar—in hhds., 89°, $1·60 (packages included). Dark Crystals, 96°, $2·00 per 100 lb.

British Guiana,—April 7, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $7·75 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 12c. per lb.
Dhal—$3·90 to $3·95 per bag of 168 lb.
Eddoes—$1·00 to $1·20 per barrel.
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Onions—5c. to 6c. per lb., ex store; Garlic, 6c. to 7c.
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Plantains—24c. to 72c. per bunch.
Potatos, English—$2·25 to $2·50 per barrel.
Rice—Ballam, $4·65 per 177 lb., ex store; Creole, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·32 per barrel.
Tannias—No quotations.
Yams—White, $1·68 to $1·80 per bag.
Sugar—Dark Crystals, $2·00; Yellow, $2·30 to $2·40; White, $3·00 to $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·50 per M.

Trinidad,—April 7, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary, $12·60 to $13·00; Estates, $13·00 to $13·50 per fanega (110 lb.).
Cocoa-nuts—$20·00 per M., f.o.b., selected in bags of 100 (husked).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—65c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6¾c. to 7c. per 100 lb.
Copra—$2·75 to $3·00 per 100 lb.
Onions—$3·00 to $4·00 per 100 lb.
Molasses—No quotations.
Potatos, English—$1·25 to $1·40 per 100 lb.
Rice—Yellow, $4·25 to $4·50; White Table, $5·25 to $6·00 per bag.
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Curaçoa,
Dutch West Indies,
March 5, 1904.

DUSSEL,
Secretary.

FOR COTTON GROWERS:

'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.)

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 54. BARBADOS, MAY 7, 1904. PRICE 1*d.*

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Sugar-cane Experiments in the Leeward Islands.

THE last issue of the *Agricultural News* contained a brief review of the recently issued report on the sugar-cane manurial experiments conducted under the direction of the Imperial Department of Agriculture in the Leeward Islands during the season 1902-3. The important nature of these results warrants our making a further reference to them.

As stated by the Hon. Francis Watts in his letter of transmittal, 'a considerable amount of information has been accumulated, and definite results are now appearing, some of them of a striking character.' Amongst these might be mentioned the detrimental effect of dividing the nitrogen into two doses. The experiments have clearly demonstrated that it is better, both for plant canes and ratoons, to give all the nitrogen in one application. It is further shown that this effect is most marked where potash is given in considerable quantity with the first dose of nitrogen. It is suggested that this somewhat unexpected result is to be explained by reference to the manner of feeding in the case of the sugar-cane.

We would draw particular attention to the statement made by Mr. Watts that 'plant canes, when the field in which they have been planted has been properly tilled and manured with pen manure, require no artificial manure.' Planters are advised to apply artificial manures to plant canes only when it has been found impossible to give the requisite amount of pen manure. With ratoon canes, however, it is very different. It is clearly shown by the experiments that maximum crops can be obtained only by the use of artificial manures.

For ratoon canes, nitrogen, in a rapidly-acting

form, is very necessary and should take the form of 2 cwt. to 3 cwt. of nitrate of soda or 1½ cwt. to 2½ cwt. of sulphate of ammonia. It will be found profitable to apply, in addition, potash and phosphate, and for this purpose the application of ¾ cwt. of sulphate of potash and 1½ cwt. to 2 cwt. of either basic phosphate or superphosphate is suggested. The manurial requirements of ratoon canes differ considerably from those of plant canes.

It should be borne in mind that these conclusions apply only in the case of sugar estates in the Leeward Islands and under the conditions normally existing there.

In an appendix to the report Mr. Watts deals with the relationship between the tonnage of canes and the pounds of sucrose in the juice. The conclusions arrived at must be regarded as of considerable importance both to practical planters and to chemists in charge of sugar-cane experiment stations.

Hitherto it has been the custom to make comparisons between the various plots on the basis of the pounds of sucrose per acre in the juice expressed from the canes. Carefully conducted experiments have shown, however, that the artificial manures employed do not exert a profound influence upon the amount of sugar in the cane, in contradistinction to its influence upon the weight of the cane. The variations in the amount of sucrose as a result of the influence of manures are not great.

Mr. Watts therefore arrives at the following conclusion: 'Manures in such quantities as are likely to be used in ordinary practice in the Leeward Islands, exert their influence chiefly in altering the weight of the cane per acre without profoundly altering the weight of sucrose to the ton of cane. It is probable that we shall in the future make our comparisons in manurial experiments on the basis of tons of cane rather than of pounds of sucrose.' Some doubt has existed as to this point, and the conclusion is, therefore, of considerable importance. It may readily be understood how this will simplify the work of the Experiment Station worker and enable the results to be attained at a less cost than formerly.

Sweet Cup. The purple-fruited Sweet cup (*Passiflora edulis*) introduced by the Imperial Department of Agriculture from Jamaica is doing well at the Botanic Station at Antigua. A single vine is bearing at present about 100 fruits. The results at other Stations where plants have been raised would be of interest.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

The following is a progress report by Professor d'Albuquerque, M.A., F.I.C., F.C.S., and Mr. J. R. Bovell, F.L.S., F.C.S., on the sugar-cane experiments at Barbados for the half-year ended December 31, 1903:—

During the half-year under review, the report of the manurial experiments for the crop reaped in 1903 was published. These experiments were carried on at Dodds Botanic Station, St. Philip, and at six plantations situated on typical black and red soils.

At four of the stations the plots were approximately 1 acre each in area, and were laid down in duplicate. The object in adopting a limited number of plots of the larger area was, in the first place, to ascertain how far the results obtained with the ordinary small plots would agree with those on a somewhat larger scale, and, in the second place, to meet the wishes of planters who had expressed a desire to see some of the results tested on larger plots.

At Dodds a gangway or unoccupied space is left around each plot; this eliminates the possibility of the canes in one plot interfering with those of the adjacent plots, but it also introduces a condition somewhat different to that of ordinary cultivation.

The waste of land and consequent expense which would attend the employment of this method on a large scale, especially on ordinary estates, led us to look for another method of attaining the same object. Accordingly, the whole field under experiment is planted in canes and parcelled out into plots, and the whole of each plot is manured with its own proper fertilizer. In reaping, however, the outside ring of canes of each plot is left uncut and serves as a kind of guard ring to prevent the roots of the inner (reaped) portion of each plot interfering with those of its neighbours. This reduces the experimental area of the plot, but renders the conditions of cultivation perfectly normal and eliminates the likelihood of the manuring of one plot interfering with that of others.

The lines upon which the manures were selected were the same as in the previous three years: that is to say, active forms of nitrogen (sulphate of ammonia, nitrate of soda), basic slag phosphate, superphosphate, sulphate of potash and slaked lime were the materials used for the experiments.

The weather conditions were exceedingly unfavourable for the crops and for agricultural experiments, and the results of the manurial experiments serve to indicate the sort of return to expect from manuring in a year of repeated periods of drought rather than under the average conditions under which agriculture can be pursued with profit. The root-fungus (*Marasmius sacchari*) was, under the conditions prevalent this season, distinctly in evidence in all parts of the island and must be reckoned with as a disturbing factor in estimating the value of the experimental results.

The soil of Summervale field at Dodds, which was the manurial experiment field reaped this year, is a heavy clay black soil. It is poor compared with the soils generally under cultivation in Barbados: its content of carbonate of lime is below the average and the amounts of nitrogen, phosphoric acid and potash are exceedingly low. If well

tilled and adequately manured with farmyard manure, it is to be expected that this soil would respond handsomely to appropriate chemical fertilizers. During the season under review, however, the droughts that occurred interfered with the normal sequence of events, and the usual favourable effect of applying sulphate of ammonia was not observed, except in the case of the plot that received 200 lb. sulphate of ammonia, part applied in January and part in June, which showed an increase by its application of 8½ tons of produce (canes and tops). The plot that received 360 lb. nitrate of soda gave an increase of 7 tons produce, but the best plot of the whole field was that which received 40 lb. nitrogen in the form of dried blood (i.e., about 350 lb. dried blood) all applied in January, which showed an increase of 10 tons produce, say, ¾ tons of marketable sugar with its attendant molasses.

Of the phosphate plots those that received 200 lb. to 250 lb. basic slag alone showed a small increase of 2 to 4 tons of produce.

The potash plots showed a small but unprofitable increase as the result of the application of 80 lb. to 200 lb. sulphate of potash per acre.

At Foursquare a field of 8½ acres was under experiment. The soil is a rather stiff, black clay, and, in respect to its chemical constitution, altogether superior to that at Dodds, containing especially an abundance of potential phosphoric acid and by no means deficient in nitrogen or potash: moreover, it received an ample application of good farmyard manure. In a year of drought it is therefore not surprising that the canes should be unable profitably to utilize any further supplies.

As a matter of fact, the mean result of the twenty-one plots that received farmyard manure but no chemical manure was 21½ tons of produce per acre. Twenty plots that received farmyard manure and an ordinary chemical manure, consisting of 200 lb. sulphate of ammonia, 120 lb. nitrate of soda, 250 lb. basic slag and 100 lb. sulphate of potash, gave a mean result of 24 tons produce, that is, an increase of 2½ tons of produce over the no chemical manure plots: a result which shows that in a year of drought the increased return would not compensate for the expenditure on manure.

It is true that some of the plots showed larger returns than this, but, on the whole, it seems safest to limit ourselves to the following:—

In the nitrogen series most of the plots showed no increase as the result of the application of the nitrogen.

The plots that received minerals and 60 lb. nitrogen as sulphate of ammonia showed an increased yield of 2½ tons produce.

Double minerals in addition to nitrogen produced no adequate return for the extra outlay.

In the absence of minerals, nitrogen in small applications gave unfavourable results; in large applications (80 lb. to 100 lb.) gave favourable results.

Phosphatic manures appeared to cause a small increase, and on the whole, superphosphate appeared to be superior to basic slag.

The application of 25 lb. potash as sulphate gave an increased yield.

Still in view of the interesting fact that an application of slaked lime has in other (and normal) seasons given good results in heavy clay soils, even though they were rich in carbonate of lime, we may here state that the six plots that received slaked lime gave an average yield of 27 tons of produce, that is, an increase of 5½ tons, and we are inclined to attribute this result to the well-known effect of the soluble forms of lime on heavy clay soils of uniting the fine particles into larger aggregates and thereby improving the drainage and aeration of the land.

At Hopewell three experimental fields were reaped containing, respectively, plant canes, first and second ratoons.

In *Fletcher field* 3½ acres were laid under experiment and divided into twenty-seven plots, each containing 252 stools of canes. The soil is a red clay, rich in nitrogen and phosphoric acid. The field received a heavy application of farmyard manure, 40 tons per acre.

The results show an increase by manuring, which, in the most favourable plots, amounted to 6 tons produce per acre. Nitrogen was the most important constituent in producing this result, but there is evidence that both the phosphates and potash contributed to increase the yield. Basic slag was a more effective form of phosphate than superphosphate.

Ashford field contained 4 acres of experimental plots which were of the usual size. The soil is a red, stiff clay on a stiff clay subsoil rich in nitrogen, carbonate of lime, and other mineral constituents required by plants. Before the canes were planted 30 tons per acre of farmyard manure were applied, and besides the experimental manures applied during the growth of the plants the ratoons also received various applications. Briefly put, the results of the experiments go to show that, in the case of these first ratoons, an application of chemical manure gave the substantial increase of 8 to 10 tons of produce, and that this increase was due in part to the application of phosphate, and in part to the application of nitrogen. The experiments did not show any superiority of one form of phosphate over the other.

Hopper field contained second ratoons, and the experiments were a continuation of those of the two previous seasons, when plant canes and first ratoons were reaped from the same plots. The soil is a red clay and rests on a red clay subsoil. It is rich in carbonates of lime, nitrogen and phosphoric acid.

Some of the plots received an application of 40 tons per acre of farmyard manure before the canes were planted.

The results may be summed up as follows:—

In the case of land that had received no farmyard manure before the canes were planted—

Minerals alone produced no effect.

Minerals and nitrogen produced a crop of 20 tons produce, and minerals were necessarily applied to the ratoons for the nitrogen to produce its full effect.

Basic slag phosphate produced no effect; superphosphate a small increase.

Potash in increasing applications up to 75 lb. produced a large increase of yield.

In the case of land that had received a large application of farmyard manure before the canes were planted—

The application of nitrogen up to 75 lb. or 100 lb. produced a large increase in the yield.

It is not clear whether minerals produced any effect when applied in addition to nitrogen, when the amount of the latter did not exceed 75 lb.

When the application of nitrogen reached 100 lb., the application of minerals in addition produced no further increase of yield.

ONE-ACRE PLOTS.

The one-acre manurial plots were at Hampton, Bushy Park, Ruby and Blowers. The results are, on the whole, similar to those obtained with small plots at Dodds and Foursquare, in that they show a comparatively small increase of yield as the result of the application of chemical fertilizers. This we attribute to the small and irregular rainfall of this season.

(*To be continued.*)

WEST INDIAN PRODUCTS.

Cocoa-nuts in Canada.

The following note on the trade between the West Indies and Canada in cocoa-nuts has been received from Mr. J. Russell Murray, of Montreal:—

The great shortage of Jamaica nuts has brought about a demand for nuts from the various other islands, and I am writing to-day to the secretaries of the Agricultural Societies in the various islands asking them to put me in communication with cocoa-nut growers. The Trinidad and Tobago section I have already covered, but if you know of any source besides Dominica, I should be glad if you would give me the necessary information.

Do you know any growers of San Blas nuts; and, if so, can you give me their addresses? These are required here for a special class of trade the British West Indian nuts do not cover and I should like to get into connexion with them.

Cassava for Glucose Manufacture.

Mention has been made in the *Agricultural News* (Vol. III, p. 12) of a sample of dried, sliced cassava tubers forwarded from St. Lucia, which, it was stated, were used in the manufacture of glucose. Samples of these tubers and others prepared in Barbados were forwarded by the Imperial Commissioner of Agriculture to Messrs. Garton, Hill & Co., Battersea, London, S.W., large manufacturers of glucose, with a request that they would furnish a report as to their value and suitability for the market.

In their reply, Messrs. Garton, Hill & Co. state that the tubers are not in a convenient form for the manufacture of glucose and would have to be crushed or ground before going into the convertor. This extra treatment would be troublesome and expensive. For this reason it is not thought that the sliced tubers would have a sale in England.

It appears, however, that there are prospects for a trade in cassava with glucose manufacturers, if it be prepared in another form, viz., as a meal. A sample of cassava meal was forwarded to the same firm from Jamaica by Mr. H. H. Cousins, Agricultural and Analytical Chemist. Messrs. Garton, Hill & Co. think that there should be a market for a limited amount of this flour, which they considered a very nice article, and report as follows:—

This substance would be a suitable material for glucose and should command about 10*s.* per ton more than Borneo sago flour for this purpose. This would make its market value about £5 10*s.* per ton as competing with rough sago and tapioca flours, but as I mentioned in my last letter the fact that several of the largest glucose makers have put up plant to treat the whole maize – separating oil, husk, gluten, etc. and converting the starch at once into glucose—will make the demand for flour for glucose manufacture less certain. Still I am inclined to think that there should be a market for a limited amount of this flour, and it is quite possible a demand for it for other purposes might arise, if the quality were similar to this sample.

West Indian Sugar in Canada.

The following is a circular letter, dated April 7, which has been sent by Mr. J. Russell Murray, of Montreal, Canada, to correspondents in the sugar trade with reference to the trade in West Indian sugar in Canada and particularly to the preferential tariff accorded by the Dominion Government:—

As you will see by the copy of the *Montreal Gazette* I send you by this mail, we have managed to give the fullest publicity to the action of the St. Kitt's, Antigua and Trinidad sugar planters in respect to the preferential tariff on sugar accorded by the Canadian Government to the British possessions in the West Indies, and their claim that the Canadian refiners here are reaping the entire benefit of same.

I called to-day on both the sugar refineries here, and both of them professed to be quite open to do business, but explained that they never did make firm offers and would not do so. One of them told me that they considered it a great mistake for the West India planters and merchants to offer their sugars to New York, or to them, through New York brokers and merchants, as they would very much prefer considering offers made to them through Canadian brokers.

Whether it is the prospective stoppage of consignments or the fear that the Government here may retaliate on them in some way for diverting into their own pockets what was intended to benefit the West Indian planters, I do not know; but it seems to me that it would now be possible for sales of sugar to be made to the refiners here at a fair price, provided they cannot buy the same sugar from a New York house at prices on the basis of Cuban sugars duty paid New York.

It now remains for you to send me firm offers at a price, c. & f., Montreal on the customary terms for Centrifugals 96 basis and Muscovado 89 basis in bags only, not hogsheads, in cargo lots—to Montreal direct by steamer or sailer—which I shall place before the refiners, and do my best to bring about business.

COTTON NOTES.

A planter writes:—I am of opinion that land for Sea Island cotton should be regularly cultivated and manured as for canes. Under such treatment the yield of seed-cotton has averaged 1,000 lb. per acre. This gives me a return equal to that from canes, but in eight months instead of sixteen months.

The planter continues:—I have had two places under my charge where these results have been attained, and I propose to take up cotton growing on a still larger scale this year. There can be no doubt that Sea Island cotton is the best to grow—that is, provided it is well looked after and the cotton worm is kept in check.

The Secretary of the British Cotton Growing Association writes to the Imperial Commissioner of Agriculture, under date April 11, 1904:—'You will be glad to hear that the cotton coming forward is fetching good prices, especially that from Barbados. For some reason or other the cotton from Anguilla, St. Kitt's, and some other small islands is not quite up to the mark.'

Disinfecting Cotton Seed.

In a recent issue of the *Agricultural News* (Vol. III, p. 117) an account was given of some experiments, carried on in the Mycological Laboratory of the Imperial Department of Agriculture, to test the effect on the germination of cotton seeds of steeping them in solutions of corrosive sublimate. In this series of experiments the seeds were planted immediately after being taken from the solutions.

It was then mentioned that a second series of experiments had been started. This was a duplicate of the first series, but in addition, the effect of a 1 : 100 solution was tested. The results were as follows:—

Strength of corrosive sublimate solution.	Percentage of seeds germinated.
Water	76
1 : 1,000	74
1 : 750	83
1 : 500	78
1 : 250	81
1 : 100	43

The 1 per cent. solution thus had a marked effect in reducing the percentage of seeds that germinated.

A third series was started to test the effect of steeping the seeds, drying them and then planting at different intervals. The seeds were all soaked in a 1 : 500 solution of corrosive sublimate for one hour, on March 23. The results were:—

A. Seeds planted immediately,
Percentage of seeds germinated = 73
B. Seeds dried, planted April 6 (after 14 days),
Percentage of seeds germinated = 65
C. Seeds dried, planted April 13 (after 21 days),
Percentage of seeds germinated = 74
D. Seeds dried, planted April 20 (after 28 days),
Percentage of seeds germinated = 72

It is evident, therefore, that, so far as the effect on germination goes, it is immaterial whether the seeds be planted immediately after being steeped or dried and planted at any interval afterwards.

Improvement of Indian Cotton.

In a recently published letter from the Government of India, the following important statement is made with regard to efforts that are being put forth to bring about an improvement in the quality of indigenous varieties of cotton:—

As Sir G. Watt has pointed out in the papers forwarded with Lord George Hamilton's despatch of July 17 last, efforts were at first directed too much to the acclimatization of exotic species. More recently attention has been given to the improvement of indigenous varieties at the various Government farms, and we are convinced that in this direction lies our best hope of success. The great importance of improving the quality of Indian cottons has always been recognized by the Government, and when an Inspector-General of Agriculture was appointed in 1901, he was asked to devote his first attention to the subject. Experiments were then undertaken on a more extensive scale under the personal supervision of the Inspector-General, who had studied the methods adopted in America. The cultivation of exotic varieties has not been discontinued, but the main object of the experiments has been the improvement of the quality of indigenous varieties and the possibility of obtaining new and improved varieties by hybridization.

Cotton Experiments at Nevis.

The Hon. C. Arthur Shand has forwarded the following notes on the experiments in cotton growing at the Experiment Station at Nevis during 1903-4:—

The experiments were particularly designed to test the best distance for planting cotton. For this purpose four plots (A,B,C,D,) were planted in cotton at varying distances. The following table gives particulars for each plot:—

Plot.	Area in sq. feet.	Distance between plants.	Yield in pounds of seed-cotton.
A	$708\frac{3}{4}$	3 x 3	$36\frac{3}{4}$
B	$708\frac{3}{4}$	$2\frac{1}{2}$ x 3	$24\frac{1}{4}$
C	$708\frac{3}{4}$	2 x 3	$26\frac{3}{4}$
D	$708\frac{3}{4}$	$1\frac{1}{2}$ x 3	$41\frac{3}{4}$

It will be observed that the best results were obtained from plots A and D, especially the latter. The land was treated in the same manner for each plot, and no manure of any kind was applied. The total yield from the four plots (about $\frac{1}{15}$ acre) was 129 lb. of seed-cotton, or at the rate of about 1,900 lb. per acre.

Owing to frequent applications of Paris green no damage whatever was done by the cotton worm.

Green Dressing. We are informed by Mr. John Belling, B.Sc., that in the drought of 1903 the velvet bean, grown in St. Kitt's as green dressing, was often skeletonized by caterpillars, while the cow pea with leathery leaves was scarcely ever attacked by the insects.

THE PROSPECTS OF CASSAVA STARCH.

Mr. H. H. Cousins, M.A., F.C.S., writes as follows on this subject in the Bulletin of the Jamaica Department of Agriculture for March :—

Through the enterprise of Mr. J. W. Middleton in testing the commercial production of starch at Longville and his public spirit in placing his results at the disposal of the Board of Agriculture, it is now possible to form some definite opinion as to the possibilities of cassava starch as an industry for Jamaica.

The experiment at Longville has been of a tentative character, and the actual possibilities of the industry, when established on a reasonable commercial scale and with the best machinery and management, are far in excess of those directly indicated by Mr. Middleton's preliminary results.

AGRICULTURAL YIELD.

The returns of tubers per acre at Longville, as recorded by Mr. W. J. Thompson, varied considerably. Where the cassava had been planted between bananas or under shade the yield was not satisfactory. Eight tons of tubers per acre were obtained on one piece of land, and there is every reason to believe that by thorough tillage and the propagation of the best varieties of cassava a return of 10 tons per acre can reasonably be expected. Mr. Joseph Shore finds that this is a fair return from lands in cassava on the northside.

The cost of production at Longville was 10*s.* 6*d.* per ton with an 8-ton crop, allowing £1 per acre for rent. I estimate that the cost of production can be reduced to 8*s.* per ton by reasonable economies and improvements in the cultivation.

The Florida factories pay 18*s.* per ton for the tubers in the field, the cost of digging and delivery to the factory being about 6*s.* a ton in addition.

COST OF MANUFACTURE.

At Longville, 6 tons of cassava tubers, pulped in a small St. Vincent rotary grater, yielded 1 ton of air-dried starch by the West Indian process. The cassava contained about 29 per cent. of starch. The actual cost of production of the starch, including the growing of the cassava, amounted to £8 per ton.

BY-PRODUCTS.

The bitty or residual pulp, when dried to a content of 15 per cent. of moisture, amounted to a return of $1\frac{1}{3}$ tons of dry material to each ton of starch. The composition of this product closely corresponded to that of the meal from the whole tubers sun-dried. Cassava bitty is therefore a valuable food-stuff for cattle or pigs. If we deduct 30*s.* per ton for the cost of expressing the excess of moisture, drying and bagging the bitty, its net value cannot be less than 30*s.* per ton to the factory, on a low selling price of £3 per ton. A deduction of £2 per ton on the cost of the cassava starch is therefore apparent.

The cost of production of a ton of cassava starch with a process that only recovers 60 per cent. of the total starch in the tubers, is therefore only £6 per ton.

COMMERCIAL PROSPECTS.

The starch prepared by Mr. Middleton at Longville was of variable quality at the outset until a satisfactory method of working had been arrived at.

By careful neutralization of the crude starch with soda, using litmus papers as an indicator, it was found possible entirely to neutralize the organic acids of fermentation that are inseparable from any process of working on cassava tubers. A high-grade starch, free from fibre and dirt, was produced, and this should fetch anything from £15 to £20 a ton wholesale.

A modern plant, which obviated the necessity of peeling the tubers by hand, would save £1 per ton in the cost of labour for making the starch. A return of at least 20 per cent. of starch equal to 2 tons per acre should be obtainable.

It would appear that in cassava starch we have a product that will give us double the financial return per acre of sugar under ordinary Jamaica conditions and at a cost of production so considerably less, that there is large margin for profit, without which no industry can be generally successful in this island.

RECOMMENDATIONS.

The chief requirements for ensuring the success of the industry are the following :—

(1) Capital for installing the best plant for dealing with tubers, so as to eliminate all unnecessary hand-labour and ensuring the best product possible.

(2) Lands of light texture in a district of moderate rainfall, capable of being cultivated by implements and within easy reach of the factory.

(3) A good water-supply with a system of sand filtration and a covered tank for storing pure water.

These conditions obtain on large areas of alluvial soil on the south side of the island, where bananas languish in an average season for lack of water. A system of 'cassava farming' by the local peasantry should be started in connexion with each factory.

Experiments to test the most profitable varieties and methods of tillage, cultivation and management should be organized by the Department of Agriculture.

ANALYSIS OF CASSAVA PRODUCTS FROM LONGVILLE.

Products.	Moisture Total.	Starch Total.	Insoluble fibre.
Starch A.	15·62	76·67	0·32
Starch B.	15·89	76·67	0·35
Starch C.	17·54	76·60	0·36
Starch D.	17·62	78·13	0·42
Bitty	15·13	65·71	3·89
Meal from whole tubers	15·08	55·70	2·45

OIL OF BEN.

The *Pharmaceutical Journal* of April 9 has the following note on oil of ben :—

According to J. Lewkowitsch, the characters usually given for 'ben oil' do not accord with those afforded by an authentic specimen of the true oil, furnished by the Director of the Imperial Institute, derived from *Moringa pterygosperma*, from Jamaica. The chief interest of oil of ben lies in its very low iodine value ; this explains why the oil is specially valuable for lubricating watch springs and other delicate machinery.

An interesting account of this oil will be found in the *Kew Bulletin* (1887, p. 7), where it is mentioned that for many years efforts had been made in Jamaica to prepare oil of ben from the seeds of the horse radish tree (*Moringa pterygosperma*), but apparently without success. The original oil of ben is supposed to have been obtained from another species (*M. aptera*), a native of Nubia and Arabia.

SCIENCE NOTES.

The Talipot Palm.

We are informed by Mr. J. Jones, the Curator of the Botanic Station at Dominica, that the Talipot palm (*Corypha umbraculifera*) growing in the Public Gardens at Roseau is now throwing out its infloresence. This plant is said to be about thirty years old.

References have already been made in the *Agricultural News* (Vol. III, pp. 44 and 108) to the fruiting of this palm in British Guiana and Jamaica. The plant in British Guiana was about twenty-eight years old at time of fruiting; it possessed 'a stem 50 to 60 feet high, crowned with a panicle, 10 to 12 feet long, bearing an enormous crop of fruit.'

This palm is a native of Ceylon, where its leaves are commonly used by the natives as umbrellas and also for thatching. The talipot palm fruits but once in its life, the fruiting process terminating its life.

Ylang-Ylang.*

The Ylang-Ylang or Ihlang-Ihlang tree of the Philippine Islands yields flowers that furnish by distillation a valuable essential oil.

The tree is cultivated in many of the Botanic Gardens in the West Indies and it appears to do well in this part of the world. It belongs to the Sour sop family (*Anonaceae*), but the fruit is not edible. The chief, in fact the only, interest attached to it is based on the perfume extracted from the flowers.

According to *Indian Planting and Gardening*, the flowers of the Ylang-Ylang are being utilized in Réunion for the production of an essential oil that is in large and increasing demand in Europe. The price has been steadily rising during the last few years. According to M. de Flacourt, a hectare of land at Réunion planted with 500 Ylang-Ylang trees should yield a net profit of 1,116 francs.

Mr. J. Charles Sawer, in a letter dated February 13 last, states that Ylang oil is costly and it cannot be prepared properly except by using a vacuum still made in London for such special purposes. He adds: 'Manila Ylang oil goes higher and higher in price, the supply being insufficient for the demand; the flowers obtain high prices in the island of Luzon'.

Plants and Nitrogen.

It is a well-known fact that the majority of green plants require their nitrogen to be supplied to them in the form of nitrates. Most green plants are unable to take in nitrogen which is in the form of ammonia or ammonia compounds. The following abstract, taken from the *Experiment Station Record* of February 1904, gives an account of a small, green alga, which has adapted itself to the taking in of nitrogen in the form of ammonia compounds. The original paper appeared in the *Proceedings of the Royal Society*, Vol. 71, pp. 458-76:—

A study is reported of a small, unicellular, green alga, which was noticed as frequently present in sewage and sewage materials, when these had been kept for some time, particular reference being paid to its nitrogen metabolism. Diluted ammoniacal solutions were found to have become infested with this alga, a fact that seemed of interest in the physiology of the plant.

Pure cultures were prepared and grown in various media. While chlorophyll-bearing plants in general prefer their nitrogen in the form of nitrates; these are found readily to assimilate nitrogen in the form of ammonia and to present the best growth when grown in cultures containing ammonia or various ammoniacal compounds. This feature of the nitrogen assimilation of the plant is believed to be a specialized characteristic developed from the growth of the plant in water, which contained comparatively large amounts of ammonia such as are found in sewage and sewage-polluted water.

Albizzia Lebbek.

The following note on the growth of *Albizzia Lebbek*, known in Jamaica as 'Woman's Tongue' and in Barbados as 'Barbados ebony', is taken from the Trinidad *Bulletin of Miscellaneous Information* for April:—

This tree, though so common in the island of Jamaica, is one which does not thrive under cultivation in Trinidad; for even with the greatest care it can hardly be kept alive.

This fact is strong evidence that there exists a decided difference in climate between the two islands.

That the difference is not one of temperature, merely, is shown by the fact that the mean annual and daily readings at the two places differ but slightly; the mean annual by half a degree only, at similar elevations.

From observations during a series of years it would appear that the failure of *Albizzia Lebbek* in Trinidad, is due probably to the greater humidity which exists in the latter place, and possibly to a deficiency of calcareous matter in the soil. The Saman (*Pithecolobium Saman*, Benth.,) is a tree which flourishes in Jamaica side by side with the *Albizzia*, and does equally well, if not better, in Trinidad.

We have here, therefore, a case which is interesting as to the why and wherefore of the different growth shown by two leguminous trees of similar habit and nearly related botanically to each other. In Trinidad and also Jamaica there is strong evidence that the Saman, ('Guango' of Jamaica) is an imported tree, while the *Albizzia* is indigenous to Jamaica but imported to Trinidad.

AGRICULTURE IN THE ARGENTINE.

The *Consular Report* on the Argentine Republic for 1902 and 1903 has the following reference to agricultural progress in that country:—

The abundant harvest of 1902-3, followed by the excellent prospects of that of 1903-4, has given a remarkable stimulus to agriculture in the Argentine Republic, and the area cultivated in 1903 shows a very large increase over any previous year. The chief features are the increasing cultivation of maize, especially in the province of Santa Fé, and the continued laying down of land to lucerne (alfalfa) in the western and north-western districts, where water is found only a few metres from the surface. In fact the growing of lucerne may be said to have revolutionized agriculture in this country, where it will yield excellent crops for many years, if not eaten down too closely by sheep or ruined by drought in districts where the water is deeper.

The imports of agricultural machinery, threshing machines, etc., from the United Kingdom and the United States have been exceptionally large of late.

* *Artabotrys odoratissimus.*

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 143 of this volume.

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Agricultural News

Vol. III. SATURDAY, MAY 7, 1904. No. 54.

NOTES AND COMMENTS.

The Utilization of Sea-moss.

A note appeared on the subject of sea-moss from Anguilla in the *Agricultural News* (Vol. III, p. 8) and it was mentioned that a sample had been forwarded to the Imperial Institute for a report as to its possibilities.

In his report Professor Dunstan states that the two samples (one from Barbados and one from Anguilla) were similar in character to Irish moss, and it was thought that they might possibly prove suitable for some of the purposes for which the latter is employed.

The West Indian mosses are less completely soluble in water than Irish moss, especially the sample from Barbados. In regard to gelatinizing power, the sample from Barbados was distinctly superior, and that from Anguilla inferior, to Irish moss. Six grains of Anguilla moss, five of Irish, and two of Barbados were required to form a jelly with 100 c. c. of water. Both specimens of West Indian moss yielded a mucilage which possessed good adhesive properties.

A firm of brokers, to whom specimens were submitted for valuation, reported that, as far as could be judged from the small sample available, the West Indian mosses were not equal to Irish moss for technical purposes, and that consignments represented by the sample would fetch from 10*s.* to 15*s.* per cwt. The market price of Irish moss was from 20*s.* to 30*s.* according to quality. It is suggested that consignments of several hundredweights of the two mosses should be forwarded in order that the market could be properly tested.

Cassava Starch.

In the last issue of the *Agricultural News* (p. 137) reference was made to the presence of acid in cassava starch, and to the results of Professor d'Albuquerque's examination of a sample from Barbados. Professor d'Albuquerque has similarly examined a sample of cassava starch from Dominica, and reported: 'The acidity of this sample by ordinary tests is imperceptible. The delicate method of estimation employed discloses a trace of acidity exceedingly small compared with the best available samples of arrowroot starch. This is a very carefully prepared starch.'

Sugar Industries of Hawaii and Trinidad.

The *Sugar Planter* publishes an interview by a representative of a local paper with Mr. W. G. Kay, a sugar planter of Trinidad, who was on a visit to Hawaii for the purpose of studying steam cultivation and methods of production generally. Mr. Kay draws an interesting comparison between the two countries as sugar producers.

Conditions are widely different in Trinidad and Hawaii. In Trinidad planters have to depend entirely upon the rainfall. The average production in Trinidad is 2 tons of sugar to the acre; in Hawaii it is double that amount. The total sugar output of Trinidad is 60,000 tons yearly. The cost of production is from $45 to $48 per ton; in Hawaii it is from $40 to $45.

Mr. Kay was of opinion that Hawaiian planters go in for more intense cultivation; the labour-saving devices require a minimum of supervision. Triple crushing is the rule in Hawaii, while in Trinidad double rollers are used almost entirely.

Shipments of Cotton from Barbados.

A return with valuation of 82 bales of cotton shipped from Barbados on February 2 and March 12 last was received by last mail from the British Cotton Growing Association.

There were 69 bales of Sea Island cotton and 13 bales of Egyptian cotton. The average price quoted for the Sea Island cotton was just under 15*d.* (30c.) per lb. The highest was 16½*d.* (33c.) per lb; the lowest 13*d.* (26c.) per lb.

The highest figures, 16*d.* to 16½*d.* per lb., were quoted for a Sea Island cotton described as 'clean, bright, well prepared, with fine, long staple.'

The lowest price was for Sea Island cotton described as 'staple short, coarse and irregular.'

For Egyptian cotton the highest value quoted was 8¾*d.* (17½c.) per lb., described as 'fairly clean, staple irregular but fairly strong.' The average for Egyptian cotton was a little over 8*d.* (16c.) per lb.

Later advices to hand state that of 51 bales of Barbados cotton recently shipped to Manchester the prices were as follows:—

Forty bales of Sea Island cotton sold for 15*d.* to 16*d.* per lb.; 11 bales of Egyptian cotton sold for 8*d.* to 10*d.* per lb.

Cotton Ginneries in the West Indies.

An article on this subject appeared in the *Agricultural News* for February 27. It was there stated that 'in regard to all these ginneries it is desirable to place on record an appreciation of the very active part taken in their establishment by the British Cotton Growing Association.' This is not quite correct, as we learn that the ginneries erected by Messrs. Sendall and Wade at St. Kitt's and Montserrat received no support from the British Cotton Growing Association. The whole cost, including their erection, was borne by the firm named.

Copra in Samoa.

The only important export from Samoa at the present time is copra. The *Consular Report* for 1903 states that the value of the exports of copra was £68,526, or over 98 per cent. of the total value of exports. There was a serious decline in the value of copra exported owing to a drop in price from £14 to £9 15*s.* per ton, f. o. b. The Sydney market absorbs from 3,000 to 4,000 tons of Samoan copra yearly, the product being used in the manufacture of oil and soap.

The only other products of any value are cacao (some 2,000 acres having been planted up to the present), kawa or kava (the root of *Piper methysticum* which has narcotic properties), and a little fruit. Attempts are being made to establish the cultivation of rubber trees.

Exports of Jamaica.

The *Colonial Report on Jamaica* for the year 1902-3 gives some interesting statistics with regard to the island's exports.

From the table of the exports of the ten leading products of the island it is seen that bananas occupy the first place, yielding £1,134,750, or more than one-half of the total value of the exports for the year. The value of the other fresh fruit exported was as follows: oranges, £101,054; grape fruit, £9,189; pine-apples, £2,932; mangos, £605; limes, £502. The total value of perishable fruit exported was 56 per cent. of the total exported produce of the island.

It is pointed out in this report that, however valuable the development of the fruit trade might be, it could hardly be regarded as satisfactory that the island should only have been saved from a decline by the increase in the exports of so precarious a staple as bananas. 'These remarks,' it is stated, 'have been regrettably emphasized by the devastation effected by the cyclone of August 11, 1903.'

There was an increase in the values of the exports of sugar and rum; the total for the two products was £324,244, placing them second on the list of exports. The next staple on the list is coffee. Although the output increased during the year, the value, owing to low prices, was over £20,000 less than in the previous year. It is pointed out that the salvation of this industry is only to be looked for in improvement in methods of cultivation and curing. The Blue Mountain coffee is a product of a special class and always obtains a more or less satisfactory price.

Woolly Pyrol for Green Dressing.

Foremost among the plants used in the West Indies for green dressing is the woolly pyrol (*Dolichos Lablab*). This leguminous plant is very commonly used in Barbados, where it gives excellent results when ploughed into the soil. As this plant is a low, bushy grower, it has been suggested for planting with young cacao trees for the purpose of nitrogen fixation.

At the Agricultural Conference of 1900 (see *West Indian Bulletin*, Vol. I, pp. 218-9), a discussion took place as to whether leguminous plants grown in shade, as for example, under old cacao trees, were capable of fixing atmospheric nitrogen. With the object of arriving at a definite conclusion on this point, it has been arranged for experiments to be carried out at St. Lucia and Grenada with woolly pyrol as a green dressing for cacao plantations. It is proposed to endeavour to obtain in each island half a dozen plots of cacao of about $\frac{1}{4}$ acre, three being in young cacao, where the leguminous plants would obtain a fair amount of sunlight, and three plots of fully grown cacao where the ground is completely shaded. Seeds of the woolly pyrol have been forwarded to St. Lucia and Grenada for the carrying out of these experiments, which will be reported upon in due course.

Cotton Seed Oil Industry in India.

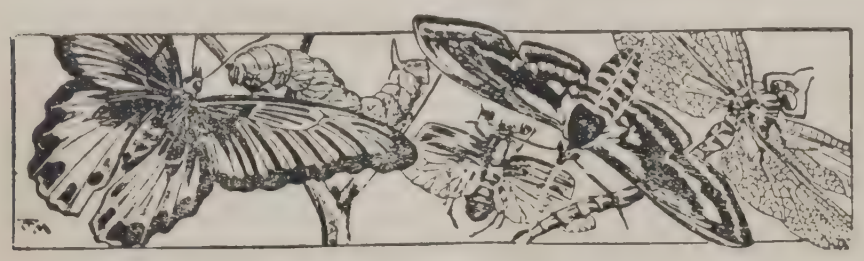
The *Agricultural Ledger* (1903—No. 9) is devoted to a discussion on the cotton seed oil industry and the establishment of cotton seed oil mills in India. The following brief summary is likely to be of interest:—

Cotton seed has always been a valuable agricultural product in Egypt and India. In America, where cotton seed was at one time practically a waste product, oil mills with machinery for delinting, hulling and pressing the seed are now extensively established. The refined oil is exported as a substitute for butter and lard, and also used locally for the manufacture of soap and salad oil. The cake is both exported and used in the country.

The introduction of the American methods into India would, from an agricultural point of view, be preferable to a large export of cotton seed, provided the cake is kept in the country. The export of oil removes nothing which would add to the fertility of the soil, whereas the export of the cake, which might be used as a cattle food or directly as a manure, would be an agricultural loss.

Very large quantities of oil seeds are exported from India, including linseed, rape seed, sesamum, cotton seed, poppy seed and earth nuts. The drain of oil seed exports from India is very severe on the agricultural resources of the country, and the more unsatisfactory because manufactured products obtained therefrom are re-imported and these help in no degree to return fertilty to the land.

On account of the difficulty of freeing the seed from lint, cotton seed oil cannot easily be pressed in the villages as is done with other oil seeds. Consequently it is practically unknown in India, although excellent feeding stuffs are made from ground nuts, rape seed, sesamum, etc.



INSECT NOTES.

The Cotton Leaf-blister Mite.

In a report to the Imperial Commissioner of Agriculture Mr. A. J. Jordan, the Curator of the Botanic Station at Montserrat, gives some of the results of the experiments that have been carried on for the purpose of controlling the leaf-blister mite (*Eriophyes gossypii*) in that island. These experiments were planned by the Entomologist on the staff of the Imperial Department of Agriculture at the time of his visit to Montserrat in January last. Mr. C. Watson, the Attorney for Dagenham estate, provided land, labour, and much of the material required, while upon Mr. Jordan devolved the general supervision of the planting operations and the application of the insecticides.

For the experiment was used $\frac{1}{2}$ acre of land near Dagenham works, which had been cleared of a crop of cotton just previous to the beginning of the experiment. This crop had been badly attacked by the leaf-blister mite. The land was divided into eight plots, and half of each was treated with crude sulphur from the local Soufrière sown broadcast at the rate of 100 lb. per acre. No effect was observed from this application. The plots which were not treated were the first to show infestation and they grew steadily worse. No better results were obtained from the plot treated with the crude Barbados oil and whale oil soap mixture.

On the other hand, all the plots which received flowers of sulphur, either sprayed or dusted on the plants, gave the best results. Up to the time of reporting, six applications had been made on each plot, and the results appear to indicate that sulphur is the remedy to be employed for this pest.

A series of box experiments with sterilized and unsterilized soil, and with sterilized and unsterilized seeds was also carried out. No effect was observable from the soil sterilization, but it is recorded that none of the plants from the sterilized seeds developed the disease until it was introduced intentionally. The soil used in these experiments was taken from the compost heap at Grove Station. Had soil from a field which had borne a badly infested crop of cotton been used, it is probable that a difference would have been noticed between the sterilized and the unsterilized soils.

Attempts to inoculate healthy cotton plants by bringing them in contact with diseased *Acacia* leaves failed. This confirms the opinion of Dr. A. Nalepa, of Vienna, Austria, to whom specimens of affected cotton leaves and the leaf galls of the *Acacia* were submitted. Dr. Nalepa was able to say that the mites were different species.

A brief account was given in the *Agricultural News* (Vol. III, p. 42) of experiments on a small scale which indicated that sulphur was likely to prove a remedy for the leaf-blister mite, and the results of this field experiment all point in the same direction. The application of these principles to a field crop will be necessary to show whether they are practicable, and it is to be hoped that further experiments may be carried on extending over the entire growing season, in which the cost of the application of remedies can be reckoned against the yield, so that data may be obtainable for definite recommendations in the future.

Sugar-cane Leaf Hopper in Hawaii.

During the past two years considerable damage has been done to growing canes in Hawaii by a leaf hopper known as *Perkinsiella saccharicida*. So serious has it become that a bulletin has been published by the Hawaiian Board of Commissioners of Agriculture and Forestry giving a complete account of the pest, and references have been made to it in newspapers in the United States and in Barbados. In view of the general interest taken in this pest the following statements may not be out of place at this time :—

The leaf hopper of the cane in Hawaii is very closely related to the cane fly (*Delphax saccharivora*) which is so common in the West Indies. In Hawaii it is an imported species, its original home being in Queensland, where it has long been known; but as it has never been destructive there, it probably has some powerful natural enemy which keeps its numbers down. In Hawaii, however, it has no such check, and it is attacking canes there with all the force common to imported pests. Attempts are now being made by the authorities to introduce lady-birds which will prey upon it. The common lady-bird in Hawaii feeds very readily upon the leaf hopper, but it is, in turn, kept in check by an enemy which lays its egg in the body of the adult lady-bird beetle.

There is probably no danger of this pest being introduced into the West Indies, as no plant canes are being brought from Australia, Java or Hawaii, where the leaf hopper is known ; and further, since planters are fully aware of the serious nature of this pest, they are not likely to take the chance of introducing it by importing canes from those countries.

A Beetle-borer of the Sugar-cane in Java.

In the communication No. 70 of the Experiment Station for Sugar Culture in West Java, is to be found a description of a beetle boring in the stem of the cane, with its life-history and an account of its occurrence in that island.

This beetle (*Holaniara picescens*, Fairm.) was first recorded in West Java in 1897 by Dr. Went. Now its distribution is quite general.

The eggs are small and are laid singly in the ground.

The larva when first hatched makes its way into the cane through the buds or eyes, frequently feeding first on the young tender roots at the node or following around the line of tender growing tissue just above the node.

The larval stage occupies two or three months. This is passed inside the cane in the burrow eaten out by the larva as it works down into the stem.

The pupal stage of six days is passed in the ground, and although it is not known how soon the female begins to lay eggs after emerging from the pupal stage and how long the egg laying is continued, it is supposed that there are only two generations per annum. The larva is about 10 mm. ($\frac{2}{5}$ inch), and the beetle 5 mm. ($\frac{1}{5}$ inch).

Plant Diseases in Hawaii. A press bulletin (No. 9) recently published by the Hawaii Agricultural Experiment Station gives an account of two fungoid diseases of crops in that island. The first disease is the well-known 'pine-apple' disease of sugar-cane, which was reported from one of the windward plantations in 1903. The treatment is that recommended by the Imperial Department of Agriculture. The second disease is the 'brown-eyed' disease of coffee, so-called from the brown spots produced on the leaves; the fungus also occurs on the half-formed berries.

BEE KEEPING.

The Cho-cho as a Bee plant.

In a bulletin issued by the United States Department of Agriculture, entitled : *The chayote : A tropical vegetable*, there occurs the following account of the value of this plant (*Sechium edule*), known in the West Indies as Cho-cho or Christophine, as a bee plant :—

As in other vegetables of the squash family, the stamens and pistils are in separate flowers, pollination taking place through the agency of insects. To attract these the flowers of both kinds, but especially the pistillate, yield abundant nectar, which is secreted in ten glands, two at the base of each of the lobes of the corolla. In most of the countries into which it has been introduced bee keeping has not been a regular industry, and the value of the chayote as a source of honey has not been noticed, but the reports of experimenters in New South Wales contain very emphatic statements on the subject :—

'When the plant is in flower I have noticed that the vines were swarming with bees, and as flowers are scarce in the autumn, the plant will no doubt be valuable as a honey producer.

The plant, which spreads over a large area, commenced flowering at the close of the year, and has been well laden with mellifluous blossoms ever since. The bees are extremely fond of the cho-cho, and with the apiarist the newly introduced plant must become a strong favourite.'

It will be seen that the chayote differs from many *Cucurbitaceae* in producing numerous flowers on each fertile branch. It has long been known that the flowers of this family are rich in honey, but from the standpoint of the bee keeper they have been considered of little importance because seldom accessible in sufficient amount, though in the United States fields are recognized as good bee pastures. The chayote seems to make up by numbers what the flowers lack in size, so that the yield of honey may be larger than in related plants. In addition to this, there is the fact that *Sechium* is a perennial bloomer in the tropics and in the sub-tropical regions has a very long season. It is thus possible that in regions like parts of Florida, where bee keeping is already an established industry, the honey-producing qualities of the chayote may be found of practical account in connexion with its other utilities.

It would be of interest if bee keepers in the West Indies would state their experience with this plant as a source of honey.

GOMMIER RESIN.

There are two gommier or resin trees known in the West Indies. The lowland gommier tree, also known as the birch or gum mastic, is *Bursera gummifera*. This has a smooth, reddish bark and is a familiar object everywhere in the lowlands in the West Indies. A specimen of 'Cachilou' or 'Incense gum' from this tree was forwarded to the Colonial and Indian Exhibition, 1886, by Dr. Nicholls of Dominica; also a 'Carib flambeaux made with gum Cachilou.' Mr. W. H. Porter sent to the same Exhibition a model of a dug-out or passenger canoe or 'pirouge' with the shell made from the gommier tree (*Bursera gummifera*).

There is also a mountain gommier tree, with a rough, ash-coloured bark, growing inland at elevations of 1,500 to 3,000 feet—*Dacryodes hexandra*. This has been met with at Nevis, Dominica, St. Vincent and Grenada, but always in high woods.

In the *Bulletin of the Imperial Institute* for March (p. 26), there is published an interesting account of a gommier resin from Dominica forwarded by the Administrator to Mr. Watts who was then in England.

It is not stated whether this was obtained from the lowland or the mountain gommier. It is described as 'opaque, whitish and viscous' and obtained from the gommier tree common 'in the forests of Dominica and that the resin is collected by the natives and used locally in the preparation of torches and as incense.' The probability is that it was obtained from *Dacryodes hexandra*.

The following particulars are given as to the commercial valuation of gommier resin from Dominica :—

The principal purposes to which elemi resin is applied are the preparation of printing inks and the manufacture of spirit varnishes, although a small quantity is also used in medicine. Specimens of gommier resin were submitted to manufacturers of printing inks and to varnish makers, who both reported that the soft gommier resin would answer their purposes as well as elemi.

Other samples were then submitted to brokers for valuation. They stated that the material was somewhat dirty, and would only be worth from 17*s*. to 18*s*. per cwt., as compared with 50*s*. to 55*s*. per cwt. obtainable for true elemi. This difference in price is probably to be accounted for by the fact that elemi is usually sold in this country in a comparatively fresh and soft condition and that it is generally fairly free from dirt.

It is probable that gommier resin, if exported in a fresh and clean condition, would realize prices more nearly equal to those obtained for true elemi.

DEPARTMENT NEWS.

With the approval of the Secretary of State for the Colonies, the Imperial Commissioner of Agriculture will proceed to the United Kingdom on duty in connexion with the work of the Department, on June 4 next.

Mr. W. B. Seabrook, the expert cotton ginner from the Sea Islands, proceeded by last mail on a short visit to the Leeward Islands in order to afford assistance in connexion with cotton ginning. On his return, he will spend a day at St. Lucia. Mr. Seabrook will leave for Jamaica by the mail of May 9 next.

GLEANINGS.

The rainfall at the Tobago Botanic Station for the year 1903-4 was 117·06 inches. This is the heaviest annual rainfall recorded since the establishment of the Station.

According to the *Guardian*, the Legislative Council of Dominica has passed a measure for largely reducing the export duties on essential oils manufactured in the island.

Specimens of the common Montserrat *Acacia*, which was formerly thought to be *Acacia arabica*, have been identified at the Royal Gardens, Kew, as *Acacia tortuosa*, Willd.

It is proposed to hold a Colonial and Indian Exhibition at the Crystal Palace during the summer of 1905. The West India Committee has agreed to undertake the charge of a West Indian exhibit.

In reference to the note in the *Agricultural News* (Vol. III, p. 124) regarding the flowering of *Monodora tenuifolia* at Grenada and St. Lucia, we are informed by the Curator that this tree has flowered annually at the Dominica Botanic Station.

As stated in our last issue, there are a few vacancies for suitable pupils at the Agricultural School at St. Lucia. There are also vacancies at Dominica and St. Vincent. Application should in each case be made to the Agricultural Superintendent.

The Imperial Department of Agriculture has placed at the Agricultural School, St. Lucia, a single-acting, hand-power, Macarthy cotton gin, received from the British Cotton Growing Association. Two similar hand-power gins are at work at Anguilla and one at St. Vincent.

Plants from two of the four seeds of the Coco-de-mer (*Lodoicea sechellarum*), received last year at the Dominica Botanic Station from the Seychelles, are reported to be growing nicely, and it is hoped that this interesting species will become established.

Messrs. Rider & Son, Ltd., of Aldersgate Street, E.C., announce the early publication of a work entitled : 'Timbers of Commerce and their identification,' by Mr. Herbert Stone, F.L.S., F.R.C.I., to whose report on the 'Results of technical tests applied to timbers' we have referred in these columns.

According to the *Times*, a syndicate has been formed to exploit the mangrove bark industry. As mentioned in the *Agricultural News* (Vol. II, p. 361) the mangrove is one of the tanning plants. Buyers are only offering £2 2*s.* 6*d.* per ton for this bark, but it is thought that better prices may be offered later.

A consignment of the best varieties of pine-apples has recently been received at the Tobago Botanic Station from Jamaica. The local varieties produce, for the most part, small fruits which are inferior in flavour to the well-known varieties introduced.

Mr. W. E. Broadway writes that there is a specimen of the Bullet Wood tree or Balata (*Mimusops globosa*) fruiting in the Botanic Station at Grenada. The tree is about twelve years old. It began bearing two years ago. A fine lot of fruit, of large size and juicy, has just been gathered from it. The fruits of the Bullet Wood tree are said to be delicious when fully ripe.

Mr. John Belling, B.Sc., writes from St. Kitt's : 'About two dozen grape vines (some American) were planted from cuttings at Stone Fort estate in February 1903. By the following autumn, having been well manured and watered, they nearly covered the arbours and produced a fair number of bunches of ripe fruit.'

Mr. Belling relates his experiences in the cross-fertilization of tobacco : 'Some Havana tobacco seed from flowers cross-fertilized by hand yielded undoubtedly stronger plants than the ordinary seed, which I have observed is usually self-fertilized and only occasionally crossed by the humming bird or hawk moth.'

A $100,000 cassava starch factory is to be built at Lake City, Florida, by a Chicago firm. The citizens of the town provided the site and subscribed for a large block of stock. The mill will have a daily capacity of 120 tons of raw material, and is expected to be a great aid to farmers in the locality by furnishing a market for cassava roots. (*Experiment Station Record*, Vol. XV, no. 7.)

The *Gardeners' Chronicle* of April 9 has an interesting review of a work entitled : 'The present condition of electroculture.' It deals with the subject of the application of electricity to vegetation. There are two stages in the electric treatment—the electrization of seeds and electroculture proper. The latter consists in growing plants in the light of the voltaic arc, etc., and also in electrifying the plants, the air and the soil.

According to the *Tropical Agriculturist*, the exports of tea from Ceylon during 1903 amounted to 151,120,009 lb. as against 84,000,000 lb. ten years ago. The United Kingdom received about 63 per cent. of this amount. It is pointed out that the amount of tea taken by the United Kingdom has not increased in anything like the same proportion as the output from Ceylon, although her consumption has appreciably increased.

In the interest of sugar manufacturers in the West Indies and British Guiana, the West India Committee is taking steps to collect and tabulate statistics regarding the cost of production of sugar on vacuum pay estates. A form is being circulated to estates which the management is asked to fill up, so that statistics may be obtained under certain heads. It is stated that 'cost of cultivation' is meant to include every expense up to delivery of the canes to the factory door and two-thirds of the management. By 'factory expenses' is meant to be included every expense from taking the canes at the factory and placing the produce f.o.b.

THYMOL FOR WORMS IN HORSES.

The following note on the use of thymol for the treatment of vermiceous diseases of horses, by Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, Jamaica, is taken from the *Bulletin of the Jamaica Agricultural Department* for March :—

Thymol is the most efficient remedy for the various forms of worms and nematodes that attack the horse. The writer has tested it in Jamaica with gratifying results and thinks it worthy of the attention of all horse owners in the island.

Bots are a frequent cause of lack of condition in our horses in Jamaica, and other types of vermiceous pests are undoubtedly of frequent occurrence.

Thymol has a marked taste and smell and special measures are necessary to secure its successful administration.

For horses we have found it most satisfactory to dissolve the thymol in rectified spirits and to stir up the solution with ten times as much sugar. By evaporation at the heat of boiling water, the spirit is driven off and a uniform mixture of thymol and sugar is obtained. This can easily be administered by mixing it with ground corn or even stirring it up with the usual feed of corn or oats. The dose recommended by F. V. Theobald* has been found quite satisfactory, both as regards efficiency and freedom from hurt to the horse, viz., 15 grains of thymol morning and evening for two successive days. In the country districts it would be well to give a diet of a laxative green food, such as Spanish Needle, to promote the excretion of the parasites.

The writer considers, from personal experience with his own horses during the past three years, that the thymol treatment should be regularly administered to all horses once a year, preferably in the spring. The market price of thymol varies considerably; at present the ruling price is 7*s.* 8*d.* per lb. in Germany. One ounce at 6*d.* would provide twenty-eight single doses, so that the actual cost of thymol per horse would not exceed one penny. Supposing 1 oz. of thymol were purchased this should be dissolved in a little spirit of wine and the solution stirred well into 10 oz. of white 'Albion' sugar. If placed in a tin pan and steamed for a short time, the spirit will evaporate and the residue can be bottled for use. The dose for a horse would be $\frac{1}{3}$ oz. night and morning for two successive days.

YELLOW FEVER AND MOSQUITOS.

The following extract on the relationship between yellow fever and mosquitos is taken from Sir Patrick Manson's lecture on 'The Disease problem of the West Indies,' delivered at the West India Committee Rooms, on March 8, to which reference was made in our last issue :—

As regards yellow fever, although we do not know the germ of the disease, we know where this germ resides and how it is acquired. The germ is so minute that it passes through the closest porcelain filter; it is ultra-microscopic. But although it is invisible, we know it exists, and that like the germ of malaria it circulates in the blood and is transferred from one victim to another by a certain kind of mosquito. This knowledge, though only some two years old, has already done much, and is destined in the future to do more, for the West Indies and the neighbouring mainland than money subsidies, banana culture, trade preferences, and all similar methods of stimulating prosperity lumped together. The world should ever be grateful to the American authors of this, the latest and perhaps the greatest, triumph of sanitary science. Thanks to the labours of these Americans, we know that the germ of yellow fever is present in the blood of the patient only during the first three or four days of the disease. If the patient is bitten at this time by the common West Indian tiger mosquito (*Stegomyia fasciata*), the insect sucks up the germ. In the tissues of the mosquito the germ now undergoes certain developmental changes, which after the lapse of about a fortnight enable it, when re-introduced into another and non-immune man by the bite of the mosquito, to multiply in the blood, and after three or four days to produce this deadly disease. If, therefore, the yellow fever patient is not bitten by the mosquito in question during the first three or four days of his illness, or if the healthy man is protected from the bites of the infected mosquito, the latter will not contract the disease, even though he lives in the same room as the patient, or wears the same clothes, or even sleeps in the same bed. Acting on this knowledge, the American sanitarians have rid Havanna of yellow fever. For the first time in nearly 200 years there is now no yellow fever in that city, once the hotbed of this disease, a hotbed from which many devasting epidemics have spread all over the West Indies and to many parts of the United States, Mexico, and Central South America.

* *Agricultural Zoology*, p. 484.

STOCK SALE AT GRENADA.

In the previous volume of the *Agricultural News* (p. 57) an account was given of the first annual sale of stock at the Woodlands Stock Farm, Grenada. The following account of the second of these sales has been contributed by Mr. W. M. Smith, Acting Agricultural Instructor at Grenada :—

The second annual stock sale at 'Woodlands' estate took place on Friday, March 25. Owing to the inclemency of the weather, the attendance of intending purchasers was very small. The sale commenced at 2 p.m. with the offer of sixty Plymouth Rock fowls put up in lots of three (one cock and two hens). These were mostly young birds and realized an average price of 18*s.* per lot, the highest price paid for one lot being 25*s.* A Plymouth Rock hen and eight chicks sold for 18*s.* 6*d.*

Thirty white Guinea fowls, in lots of six, were sold at an average price of 21*s.* per lot.

One hundred and twenty sheep were next offered in lots of twenty, but as no higher bid than £10 per lot was made, they were withdrawn. I understand that they have since been sold in one lot at $3·50 each.

Of ten horses offered, five sold at the following rates :—

A three year old half-bred filly	£40
A four year old half-bred mare	£34 10*s.*
A two and a half year old half-bred colt ...	£29 10*s.*
A " " " filly	£18 10*s.*
An aged American draft horse	£15 10*s.*

A large number of half-bred Hereford and Zebu cattle were offered, of which about twenty were sold at an average price of £7 each. These were principally milch cows and heifers.

A few pure-bred Berkshire pigs were offered, of which two sows were sold at £4 10*s.* and £5 respectively.

The results, on the whole, were not as satisfactory as last year. There was very little competition, and, consequently, the prices realized were comparatively low, and a large number of the animals were withdrawn. The stock offered this year was not quite so fine as that of last year.

SOME GRENADA LAVAS.

The following notes on 'Some Grenada Lavas' have been communicated by Professor J. B. Harrison, C.M.G., M.A., F.I.C., F.C.S., F.G.S., Government Analyst, British Guiana :—

When examining the rocks collected in Grenada in connexion with the soil examinations made by me in 1895-6, the results of which were published in 1897 under the title of 'The Rocks and Soils of Grenada,' the microscopical examinations were made in London with slices, which I had prepared in British Guiana, and which from lack of practice I had not succeeded in making as thin as desirable. The matrix of rocks of two types, which were classed as Augite-andesite with olivine and as olivine-basalt, was described by the gentleman who examined them for me as feldspathic. At the time I recognized that the analyses indicated that the rocks were of a more basic nature than either andesites or feldspathic basalts should be, but I was so fully occupied with other work that I did not investigate the cause of this.

During a hurried visit to St. George, Grenada, in 1902, while in transit to Trinidad, I collected some further specimens of lava from some blocks lying in beds of volcanic conglomerate near the mouth of the Sendall tunnel on the shore of St. George's bay, and I sent these together with some of those which, in company with Mr. Broadway, I had collected in 1895, to Messrs. Voigt and Hochgesang, and had thin sections prepared for microscopical examination; these were made sufficiently thin to allow a satisfactory examination of the matrix being made.

The lavas are made up of phenocrysts of a green augite and some of plagioclase-feldspar with some small blebs of olivine in a felspathoid matrix of granules and prisms of nepheline, granules of colourless and of green augite ; grains of olivine and some grains of original and of secondary magnetite, the latter being derived from the green augite and from olivine. The lavas are therefore according to their matrix augite-nephelinite and nepheline-basalt, the matrix of the latter being very rich in green augite and in olivine.

The analyses given in 'The Rocks and Soils of Grenada' are as follows :—

	Augite-nephelinite.	Nepheline-basalt.
Silica	46·15	42·83
Alumina	13·25	10·92
Iron peroxide	1·22	4·33
Iron protoxide	8·54	8·82
Magnesium oxide	7·82	14·02
Calcium oxide	13·89	13·20
Sodium oxide	5·77	3·24
Potassium oxide	·93	·64
Water	2·01	1·80
Titanium oxide	·36	·05
Phosphoric anhydride ...	·15	·39
Manganese oxide	·22	·12
	100·37	100·36

The augite-nephelinite is a rock of the albanase type, while the nepheline-basalt is allied to belchrose.

The ultimate magnatic compositions of the lavas are as follows : —

	Augite-nephelinite.	Nepheline-basalt.
Orthoclase	1·1	...
Andesite	7·5	13·3
Leucite	3·5	3·1
Nepheline	26·4	14·8
Diopside	49·9	41·7
Olivine	7·2	20·0
Apatite	·3	1·0
Magnetite	1·9	6·3

At the time the original examinations were made the green augite was separated from the matrix and found to have the following composition :—

	Green Augite from Augite-nephelinite.
Silica	46·78
Alumina	8·85
Iron peroxide	4·25
Iron protoxide	6·24
Magnesium oxide	13·28
Calcium oxide	20·13
	100·33

If we take into consideration the composition of the green augite which is present in both classes of the rocks, their mineralogical compositions are probably as follows :—

	Augite-nephelinite.	Nepheline-basalt.
Green augite	18·6	52·6
Diopside	37·9	3·5
Olivine	4·7	17·4
Nepheline	30·7	17·9
Anorthite	2·6	
Ilmenite	·6	·1
Magnetite	·7	2·8
Apatite	·3	1·0
Silica (secondary)	1·9	4·0
Water	2·0	1·8
	100·0	101·1

The silica shown in both of the above calculations is doubtless secondary as many of the specimens collected showed signs of commencing decomposition. When small pieces of the rocks are placed in cold diluted hydrochloric acid of specific gravity 1·05, gelatinous silica is set free, the rocks are decomposed, and in the course of a few hours fall to pieces, a sandy residue being left, the dark-coloured augite resisting the action of the acid while the felspathoids and the olivine are quickly attacked and decomposed by it.

The foregoing notes will to many appear out of place in a journal devoted to agriculture, but this is not so. They explain the formation, rapid production, and texture of the soils of great fertility in several parts of Grenada through the easy degradation, due to their mineralogical composition, of certain of its lavas to great depths.

If similar rocks—nephelinites or nephelin-basalts—occur in other parts of the West Indian Islands, soils of like properties to the Grenada ones will result from them.

MARKET REPORTS.

London,—April 12, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co.; 'The Liverpool Cotton Association Weekly Circular', April 8, 1904; 'The West India Committee Circular,' April 12, 1904; and 'The Public Ledger,' April 9, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 13/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—1/6 to 1/10 per lb.
Bees'-wax—£7 to £7 5*s.* per cwt.
Cacao—Trinidad, 60/- to 70/- per cwt.; Grenada, 52/- to 59/6 per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 60/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 38/- to 40/- per cwt.
Copra—Trinidad, £15 15*s.* to £16 per ton, c.i.f.
Cotton—West Indian Sea Island, 1/4 per lb.
Fruit—
Bananas—Jamaica, 5/- to 7/- per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 33/- to 55/- per cwt.
Honey—Jamaica, 18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/8 to 2/11; Cake, thin palish, 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 11*d.* to 1*s.* 2*d.* per gallon; Concentrated, £12 to £13 per cask of 108 gallons.
Lime Oil—1/10 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/9 to 2/3 per lb.
Nitrate of Soda—Agricultural, £9 15*s.* per ton.
Nutmegs—69's to 60's, 1/8 to 2/2; 90's to 80's, 1/- to 1/3 per lb.
Pimento—3¼*d.* to 3¾*d.* per lb.
Rum—Demerara, 7½*d.* to 9½*d.* per proof gallon; Jamaica, 1/4 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 1/- to 1/1 per lb.
Sugar—Crystallized, 14/9 to 15/3 per cwt.; Muscovado, Barbados, 13/9 to 14/6 per cwt.; Molasses, 11/- to 15/- per cwt.
Sulphate of Ammonia—£12 12*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6 per cwt.

Montreal,—April 9, 1904.—Mr. J. Russell Murray. (In bond quotations).

Cacao—Jamaica, 13c. to 13¼c.; Trinidad, 13c. to 13¾c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot c.i.f.
Cocoa-nuts—Jamaica, $28·50; Tobago, $23·00; Trinidad, $27·50; per M. c. & f.
Coffee—Jamaica, medium, 8¼c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb. c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 31c. to 34c.; Antigua, 33c. to 34½c. per Imperial gallon.
Nutmegs—Grenada, 110's, 18c. to 19½c. per lb. c. & f.
Pimento—Jamaica, 8c. to 8¼c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·32 per 100 lb. c & f.
—Molasses, 89°, $1·46½ per 100 lb. c. & f.

New York,—April 15, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 13c. to 14c.; Jamaica, 10½c. to 12½c.; Grenada, 12¾c. to 13c.; Trinidad, 12½c. to 14c. per lb.
Cocoa-nuts—Trinidads, $28 to $30; Jamaicas, $32 to $34 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7¼c. to 8c. per lb.
Ginger—Jamaica, 6¾c. to 7c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Pimento—7c. per lb.
Sugar—Centrifugals, 96°, 3⅝c.; Muscovados, 89°, 3 3/16c.; Molasses sugars, 89°, 2 15/16c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 20, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—14c. per gallon (Imperial).
Sugar—$1·60 per 100 lb.

Barbados,—April 23, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 lb.
Cacao—$12·00 to $12·50 per 100 lb.
Cocoa-nuts—$12·00 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $12·00 per 100 lb.
Hay—95c. to 96c. per 100 lb.
Manures—Nitrate of soda, $60·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—12½c. per gallon (puncheon included).
Onions—Madeira, (bunched) $3·65 to $3·75; Bermuda, (loose) $2·00 per 100 lb.
Potatos, English—$1·62 to $2·00 per barrel.
Rice—Ballam, $4·75 per bag (190 lb.); Patna, $3·50 to $3·60 per 100 lb.
Sugar—in hhds., 89°, $1·60 (packages included). Dark Crystals, 96°, $1·90 per 100 lb.

British Guiana,—April 21, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $7·75 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 12c. per lb.
Dhal—New, $4·00 per bag of 168 lb.
Eddoes—$1·00 to $1·20 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—5c. to 6c. per lb., ex store; Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per lb. (retail).
Plantains—24c. to 72c. per bunch.
Potatos, English—$2·50 to $3·00 per barrel.
Rice—Ballam, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·68 per barrel; $1·44 per bag.
Tannias—$2·40 per barrel.
Yams—White, $1·56 to $1·92 per bag.
Sugar—Dark Crystals, $2·00 to $2·05; Yellow, $2·30 to $2·40; White, $3·00 to $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—April 21, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—No quotations.
Cacao—Ordinary to Good Red, $12·75 to $13·00; Estates, $12·80 to $13·25 per fanega (110 lb.).
Cocoa-nuts—$20·00 per M., f.o.b., large selected peeled in bags.
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—65c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6¾c. to 7c. per lb.
Copra—$2·85 per 100 lb.
Onions—$2·90 to $3·50 per 100 lb.
Molasses—No quotations.
Potatos, English—$1·50 to $1·75 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $5·25 to $6·00 per bag.
Sugar—White Crystals, $3·25; Yellow, Crystals $2·25; Molasses Sugar, $2·00 to $2·10 per 100 lb.

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(Sgd.) H. H. R. CHAPMAN,
Vice-President.

Curaçoa,
Dutch West Indies,
March 5, 1904.

DUSSEL.
Secretary.

FOR COTTON GROWERS:

'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.)

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the Cotton-growing districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 55. BARBADOS, MAY 21, 1904. PRICE 1*d.*

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Trade in Cassava Products.

SEVERAL references have been made in recent issues of the *Agricultural News* to the possibilities of a trade in cassava products being worked up between the West Indies and the United Kingdom. Cassava is so commonly cultivated in these islands, and its cultivation so well understood by the small cultivators, that new outlets for its products would, no doubt, be eagerly taken advantage of.

It would appear that there is a possibility of a market being found for cassava in at least two directions, viz., for cassava starch and for the manufacture of glucose.

With regard to the former, much credit is due to the enterprise of Mr. J. W. Middleton, of Jamaica, in starting a factory for the manufacture of cassava starch on his property at Longville. In January of the present year, Mr. Middleton shipped a ton of cassava starch to England for the purpose of testing the market and learning the value of this product. The results of this trial shipment have already been announced in the *Agricultural News*: they were entirely satisfactory, as a price of £10 per ton in Bristol was offered, with a request that 50 tons should be shipped at the earliest opportunity.

We learn that the factory at Longville is capable of turning out 150 tons per annum, and we have no doubt that as soon as it is shown that there is a ready sale for this product, Mr. Middleton's operations will be extended. As we have already stated, cassava is a crop that is particularly suitable for the small proprietor, and there should be no difficulty in starting a very successful cassava-farming industry.

In the article published in the last issue of the

Agricultural News, Mr. Cousins puts forward very clearly the conditions that are necessary for securing the success of this new industry: these are (1) capital for installing the best plant, (2) suitable lands within easy reach of the factory, and (3) a good water supply. The utmost care will be necessary to secure a high-grade starch, free from acid, fibre and dirt. There should be no difficulty in finding these conditions in many parts of the West Indies.

Cassava starch prepared at the factory, where special attention is paid to these points, seems to be certain of obtaining good prices in the English markets; when made, however, on a small scale, and the manufacture is carried out in a dilatory manner, the product is likely to contain acid and to be, in consequence, unsuitable for the special purposes for which the high-grade starch is required.

The figures given by Mr. Cousins show clearly that the cost of growing cassava and preparing the starch is so low as to leave a good margin for profit. Moreover, the residual pulp, or bitty, is of considerable value as a food for stock. Allowing for this, the total cost of producing a ton of cassava starch should not exceed £6. When it is realized that the average yield, in Jamaica at any rate, is 10 tons to the acre, it should be obvious that the industry is one that is likely to yield handsome profits.

With regard to the other possible use of cassava, viz., as a source of glucose, the opinions of brokers have already been given in the *Agricultural News*. It is not considered that the exportation in the form of dried, sliced tubers is likely to receive much encouragement from the manufacturers of glucose on account of the additional expense entailed in grinding them. In the form of cassava flour, as recently sent from Jamaica, however, it is possible that there will be a limited market for cassava as a source of glucose, at a price, probably, of about £5 10*s.* per ton.

Messrs. Garton, Hill & Co., to whom the samples were sent for valuation, have pointed out that the demand for cassava flour will be uncertain on account of the fact that several of the largest glucose manufacturers have already installed plants for obtaining glucose from whole corn. It would appear, therefore, that it is in the manufacture of starch that we may expect to find a profitable use for cassava. There can be little doubt that where factories for the purpose could be erected, the growing of cassava might with advantage be taken up by the peasantry on a fairly large scale.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

The following is the concluding portion of the progress report by Professor J. P. d'Albuquerque M.A., F.I.C., F.C.S., and Mr. J. R. Bovell, F.L.S., F.C.S., on the sugar-cane experiments at Barbados for the half-year ended December 31, 1903 :—

EXPERIMENTS UPON TILLAGE.

At Hampton plantation a very level, 6½-acre field (Drink-water field) was marked out into ten large strips and subjected to the different processes of tillage detailed below.

The strips differed somewhat in length and width ; the width in different strips varied between 10 and 14 holes. The results are calculated to the acre and are given in the following table : —

Numbers of plots.		Canes, tons per acre.
1, 6	Subsoiled close ; lined 6 x 6 ; cane holes dug ; manured and cultivated in the usual estate manner.	
	Mean results	15·75
2, 7	Ploughed flat with disc plough, turning under farmyard manure 8 in. deep ; cane holes dug ; and cultivated in ordinary estate methods.	
	Mean results	15·59
3, 8	Subsoiled close ; a furrow opened with mould board plough 6 feet apart ; manure spread on banks ; and canes planted in furrow 6 feet apart.	
	Mean results	14·94
4, 9	Ridged with disc plough, turning under farmyard manure 8 in. deep ; planted in rows in bottom of furrow ; cultivated with Diamond cultivator ; and trashed as usual.	
	Mean results	13·20
5, 10	Subsoiling opened one way ; forked piece of land left between cane holes ; and cultivated in the ordinary estate way.	
	Mean results	14·20

It will be seen that an extreme difference of 2½ tons of canes occurred between (1) the most favourable plots and (2) the least favourable plots.

(1) The most favourable plots were subsoiled close, cane holes dug and manured and cultivated in the usual estate manner.

(2) The least favourable plots were ridged with the disc plough, turning under farmyard manure 8 inches deep, the canes being planted in rows at the bottom of the furrows and cultivated with the Diamond cultivator.

EXPERIMENTS NOW IN PROGRESS.

For the period now under review, there are 8,120 experiments covering an area of 143·294 acres. The experiments may, for the sake of convenience, be divided into two groups—the first consisting of the experiments which were being carried on during the first half-year of 1903, the latter the experiments which were inaugurated during the half-year ending December 1903.

As a detailed list of the first group was given in the last report (*Agricultural News*, Vol. II, p. 306), there is no necessity for reproducing it here. We may, however, mention that the root fungus, which last half-year we reported as existing in some of the manurial plots, is, in spite of the favourable rainfall, still in evidence, and there is no doubt that in some plots it will unfavourably affect the results. We further regret to say that, in some instances, many of the seedling and other canes have also been attacked.

On the whole, however, the stands of canes on the experimental plots have grown fairly well and will on some estates give large yields.

The following is a detailed list of the experiments of the second group, the number of plots and areas under experiment:—

EXPERIMENTS WITH MANURES.

Of the 106 plant cane manurial plots, covering an area of 14·196 acres, twenty-six are in 'Summervale' field at Dodds, twenty-six in 'Negro Yard' field at Foursquare, and fifty-four in 'Ten Acre' field at Hopewell.

By the kind permission of Mr. A. Cameron, experiments on eighteen manurial plots, extending over an area of 16·02 acres, are being conducted on the estates of Messrs. T. Daniel & Co., Ltd. Of these, six are in 'Logwood' field at Balls, six in 'No. 2 Lynch' field at Hampton, and six in 'Upper Gall' field at Ruby.

With one exception the canes on the manurial plots have grown fairly well.

EXPERIMENTS WITH SELECTED SEEDLING AND OTHER CANES.

This group of experiments consists of 182 plots with an area of 10·815 acres. Of these, thirty-four are in 'Dixon' field at Waterford, fifty-four in 'Upper Chapel' field at Dodds, twenty in 'Jack Tar' field at Coverley, twenty-four in 'Cars' field at Husbands, twenty-eight in 'Ginger' field at Henley, and twenty-two in 'Upper Belle' field at Claybury.

On the whole, the canes in this group of experiments germinated fairly well and at present there is every prospect of their giving a good return.

EXPERIMENTS WITH SEEDLING CANES OTHER THAN THOSE OF THE FIRST YEAR AND DIFFERENT NAMED VARIETIES.

In this section of the experiments there are 1,684 plots extending over an area of 22·264 acres. At Dodds there are 395 plots of plant canes in the following fields, viz:—'Cat Hole,' fifty-five; 'Upper Padmore,' seventy-six; 'Harrow,' thirty-four; 'Pilgrim,' forty-two; 'Upper Bay Tree,' fifty-five; 'House,' fifty-five; 'Lower Nightingale,' thirty-eight; and 'Summervale,' forty. In 'Seven Acre' field at the Ridge, twenty-three; in 'Cut Hill' field at Hannays, twelve; in 'Above the Yard' field at Sunbury, twenty-nine; in 'Garden' field at the Pine, thirteen; in 'Monkey Pond' field at Brighton, twelve; in 'Cow House' field at Hampton, nine; in 'South Negro Yard' field at Oughterson, seven; in 'Still Pond' field at Clifton Hall, twenty-four; in 'Simmons Bottom' field at Lower estate, eight; and in 'Sandy' field at Waterford, 1,172.

With one or two exceptions, the canes in this section of the experiments have grown regularly and a uniform stand is being obtained.

YOUNG SEEDLING CANES.

During December and January seeds obtained from some of the old seedlings and from some of the other canes were sown. Owing, we think, to the drought which occurred while the seeds were maturing, their germinating power was lower this year than any year since canes from seed have been grown, and, although more seeds were sown, fewer grew than usual, and of those that did germinate many appeared so feeble that they died soon afterwards. Still, however, 1,000 have been obtained, many of which are now looking fairly well.

Our best thanks are due to the proprietors, attorneys and managers who have so kindly placed land at our disposal and for their ready co-operation with us in carrying out the experiments.

Maple Sugar.

The *Louisiana Planter* of April 16, contains an interesting article entitled: 'Origin of Maple Sugar.' It describes the sacred myths and traditions connected with the maple tree that existed among the Iroquois Indians:—

The season of sugar making from beginning to end is a sort of carnival or general holiday among these children of nature; even those who are civilized and working in the towns will drop everything and hurry off to the woods when the sap begins to flow.

Our pioneer fathers made few improvements upon Indian methods of sugar making, but in the course of years buckets have taken the place of troughs; open pans are used instead of kettles; the furnace instead of the open fire. The work is done under cover and much of the outdoor poetry of this spring industry has faded into the light of common day, the prosaic air of our work-a-day life.

'Sap-run' does not last long; it comes and goes with the weather and has all the caprices of other delightful things, and no one can control its infinite variety. Every woodland creature enjoys the sweet drink. The squirrels slyly help themselves when no one is looking, cows will watch and empty the bucket while your back is turned, sheep will drink enough to kill them if they have half a chance, and boys must keep constant watch over the liquid.

But best of all is the delight of the honey bees in the overflowing sap. Up and down the dark, shining trunks they crawl, sometimes so full of the enticing food that they can scarcely move, and could be brushed away by the handful.

Fer-de-lance at St. Lucia. We extract the following from the annual report on the sanitary condition of St. Lucia, published in the *Gazette* of April 23:—'Unfortunately there is also recorded a death from snake bite. Some fifteen years ago, a week rarely elapsed, or a ride of 3 or 4 miles into the country, without my seeing one or more Fer-de-lance. Five or six snakes, 2 to 3 feet long, were always killed annually by the gang clearing the Victoria Hospital Grounds. Of late years no trace of one has been met with and I have not seen a live snake for several years.'

WEST INDIAN FRUIT.

CITRUS FRUIT AND PINE-APPLES IN JAMAICA.

In his report to the Trinidad Agricultural Society on the Fruit Industry of Jamaica, Mr. W. E. Smith makes the following reference to the trade in fruit other than bananas:—

Oranges, grape fruit and pines figure in no insignificant degree in the total value of their exports. During last year they shipped nearly 71,000,000 oranges (equal to 180,000 barrels), 8,011 packages of grape fruit and 8,220 dozens of pines.

The Jamaica oranges possess a very fine texture and exquisite flavour, but they are in my opinion inferior in size and appearance to those ordinarily grown here, while the best of our varieties would be hard to beat anywhere.

The greater proportion is sent to the States, but of late years considerable quantities have been put on the English market, and found much favour there.

Notwithstanding a protective duty of $1·50 per 70 lb. gross in the States, it seems that the Jamaica growers can still make a profit out of oranges so long as the Florida and California fruit is not in season. It is to the English markets that the buyers are at present looking, but the general complaint is want of more frequent shipping facilities than are afforded by the fortnightly service to Bristol by the Imperial Direct Line.

The large buyers of oranges pay from 1*s.* per 100 to as low as 3*d.*, delivered at the nearest railway station, and the process of grading, wrapping and packing is done very much in the same manner as that followed by the Symington Syndicate here. The prices realized in English ports are subject to great variation, according to quality, condition and season. Last Christmas the best quality of Jamaica oranges fetched in London from 12*s.* to 14*s.* per box of 200, a statement I should myself scarcely credit, were it not taken from a very reliable source indeed.

On all sides I heard the same story, that profits or losses (as with bananas) depend absolutely upon the kind of care given to the selection and handling of oranges before shipment, and to the maintenance of an equable temperature throughout the sea voyage. Quality and condition, as with most things, will always command and hold the best markets, and the Jamaica people seem to be fully alive to this.

Budding of the choicer sorts is practised to some extent, and hybridizing experiments are also being carried out with the Ripley and Cayenne varieties of pines, the special object being to combine the superior edible qualities of the one with the more symmetrical shape and size of the other.

TINNING PINE-APPLES.

Mr. H. N. Ridley, M.A., F.L.S., writes as follows in the *Agricultural Bulletin of the Straits and Federated Malay States* for February, on the tinning of pine-apples:—

The pines are here always peeled by hand, though machines for this purpose have been invented, as it is found more economical to use hand labour here where it is cheap. The peelers are Chinese. They cut the top and bottom off the pine and peel it with a knife, holding the pine in the left hand, which is covered with an India-rubber glove, to protect it from the acid action of the pine juice. The gloves have constantly to be renewed as they are soon destroyed by use. The pines are then put in the tins which are filled up with either water or syrup. The cores are removed previously, if required, by a tin tube which is pressed through the centre, but most pines are tinned without coring. The syrup is made of three catties of sugar to one picul of water. After the pine is put in the tin it is soldered up, and a number of tins are put on a kind of wooden raft and plunged in a tank of water heated by steam. They are boiled in this tank for from ten minutes, in the case of the smallest tins, to an hour and a half for large tins. The biggest tins weigh 5 lb. when full. After removal from the boiling water a puncture is made in the top of the tin with a hammer and punch, and in large tins two punctures. This is to let out the steam, and after this the holes made are resoldered and the tins plunged again into boiling water for nine minutes. They are then labelled and packed for export.

The object of tinning without sugar is to avoid duty on sugar, and also to enable confectioners to use them for their purposes. Pine-apple juice is often added in the case of pines not preserved with sugar, but the tins are often filled with plain water.

Other forms of exported pines are in slices $\frac{1}{2}$ inch thick (sliced pines), and with the eyes removed (eyeless pines). Bruised pines and others are often cut into chunks, or cubes. All these are tinned in the same way. Grated or jam pine is another form of export. Crystallized pines are dried in the sun, and then crystallized in sugar.

The sugar used is usually Java sugar, but Mr. Landau tells me he finds Austrian beet sugar better, on account of its colour. The cost is, however, about the same. One manufacturer states that he preserves all his pines in syrup about 30 degrees solution, using from 11 to 20 lb. of sugar to 1 cwt. of pines.

COTTON NOTES.

Cotton Factory at Grenada.

The following announcement relating to the opening of a cotton factory at Grenada, appeared in the public telegrams of May 12:—

At a meeting to-day of leading gentlemen highly representative of the commercial, agricultural and mercantile interests of the colony, at which also were present, his Excellency Sir Robert Llewelyn, Lady Llewelyn, Miss Gladys Llewelyn and Sir Daniel Morris, the Commissioner of Agriculture for the West Indies, a large cotton ginning and baling factory, erected by Mr. L. R. Mitchell, was formally opened at the upper end of the Careenage, St. George's. The machinery was erected by Mr. J. C. McQueen, and is the first cotton factory erected in the island since the American Civil War.

Cotton Experiments at St. Lucia.

The Agricultural Instructor at St. Lucia has selected the following localities for cotton experiment plots to be started under the auspices of the St. Lucia Agricultural Society and the Imperial Department of Agriculture:— Laborie, at Saphir estate; Soufrière, at Petit Delcert estate; Castries, at Vide Bouteille estate; Gros Islet, at Reduit estate; Dennery, at Anse Canot estate, and Micoud, at Mde. Micoud estate.

Each plot will be divided into three sections: section 1 to contain Sea Island cotton, planted May-June; section 2, Upland cotton, planted May-June; and section 3, Sea Island cotton, planted September-October.

Full instructions on cultural and other points are being issued to each plot owner and special stress is being laid on the necessity for the land being thoroughly forked before planting. In addition to these plots, there will be 2 acres planted in Sea Island and Upland cotton on land adjoining the Agricultural School at Union, and 3 to 5 acres will be planted with varieties of cotton at the Rivière Dorée Experiment Station.

History of Cotton in the West Indies.

Sir George Watt, Kt., C.I.E., M.B., C.M., LL.D., Reporter on Economic Products to the Government of India, delivered a lecture at the West India Committee Rooms on April 19 on 'Cotton Improvement.' The lecturer gave an interesting account of the history of cotton. We reproduce his remarks relating to the history of cotton in the West Indies:—

It is believed that in 1657 cotton had actually been experimentally grown on some of the sugar estates of Barbados. We also read that early in the 18th. century cotton had become an important auxiliary crop in Jamaica, Trinidad and elsewhere in the West Indies. Several writers allude to at least two, if not three, of the best known cotton plants of the world as having been found in a truly wild state in the West Indies. As already indicated, they supplied America with its finest seed, but the cultivation of cotton in these islands seems to have been given up in favour of sugar, thus leaving the American growers an absolutely free market in the British supply. There is nothing to show that the retirement of the West Indies was in any sense due to inability to produce cottons as fine as, if not finer than those grown in America. On the contrary, it seems fairly certain that the most prized cottons of the world (at the present day) all, or nearly all, originated in these islands. The American and West Indian series form an assemblage very distinct from that of the Old World. The leaves are very much larger, broader, nothing like so deeply segmented, and the bracteoles much more laciniate than those of India, China, Africa, and Egypt. Being also very highly cultivated states the seeds are mostly naked, after the removal of the long, silky floss. But due to their higher cultivation they are collectively much more liable to the ravages of pests and blights than are the Indian cottons. The so-called short staples of the American series are usually longer than the long staples of India. But as manifesting the great progress made by the American farmers, it may be added that the short staples of the New World belong for the most part to the Occidental series already mentioned.

The New World it will thus be seen had been rapidly and most successfully established as an important source of supply in competition with the Old, and what was to India an even more serious aspect, the American and West Indian cottons were early recognized as superior to those of Asia. In a remarkably short time, therefore, the whole aspect of the cotton trade of the world changed. India fell into a position of secondary importance. The West Indies gave attention to indigo in preference to cotton, as their auxiliary crop, but soon abandoned indigo and concentrated attention on sugar. America, on the other hand, gave cotton production a prominent position in its agricultural enterprise, and with surprising rapidity distanced India both in quality and quantity. Instead of furnishing Europe with raw cotton and cotton goods, India now became dependent on England for her own supplies of the finer cotton textiles, and a large import trade was in consequence established. The triumph was thus complete of improved mechanical contrivances and intelligent agriculture over hereditary skill and child-like traditions.

CASTILLOA RUBBER SEEDS.

The following note on the packing of castilloa rubber seeds for transport is taken from the *Consular Report on Samoa* for 1903:—

It is generally understood that great difficulties exist in obtaining seeds of the *Castilloa elastica* in good condition from long distances. These difficulties would not be so great if the senders of the seeds would observe certain essential points, viz.: 1st., the seeds must be perfectly ripe, and should not be allowed to stand any length of time before packing; 2nd., they must not be packed in too large quantities—a tin box, 6 by 4 by 2 inches, will hold 250 seeds (of course there are exceptions, such as a person travelling with the seeds giving them personal attention); 3rd., the packing (powdered charcoal) should be wetted at least twenty-four hours before using and when used should not be too wet. In packing place a layer of the moist charcoal in the tin box, and then set in rows the seeds, leaving a little space between each seed, then another layer of charcoal and so on until full. Seeds packed in this manner under ordinarily favourable conditions should keep in a slow growing condition for forty days. If the germination should happen to be rapid, or the box be a long time in transit, and the seeds when the box is opened be found to have grown into one another, then the sides of the tin box should be cut down in several places and the block lifted out intact; afterwards, by carefully teasing the rootlets apart with two pieces of pointed wood, most of the contents can be used.

PINE-APPLE FIBRE.

Farmers' Bulletin No. 4, of the Philippine Bureau of Agriculture, entitled: 'Preliminary report on the commercial fibres of the Philippines' gives an interesting account of the extraction and uses of pine-apple fibre. It is mentioned that this fibre has long been appreciated in countries where the pine-apple flourishes, on account of its strength, fineness, and durability in water. It is used in India and China for thread and woven into cloth, the Chinese importing the fibre from Singapore:—

In the provinces of the Philippines, where the plants are grown for fibre, the fruit is cut shortly after flowering, in order that the leaves may develop more fully. When the leaves are mature, they must be cut before they become old, and worked as soon as possible after cutting. The fibre is so fine that it cannot be separated from the pulp when the leaves are old and dry. As in the extraction of Manila hemp and maguey, the pine-apple fibre is also extracted in a simple and primitive way. The fibre is too light and fine to admit of being drawn as Manila hemp is drawn, so the natives in Southern Luzon and Panay resort to a method of scraping. The freshly cut leaves are spread upon a narrow bench, and with light short strokes of an iron scraper, the edge of which is not too sharp, the epidermis is scraped off. Sometimes a bamboo or wooden scraper is used, and while this method is slower, yet there is less waste, and a softer quality of fibre is produced. This exposes a layer of fibre which is lifted by the fingers or a small spatula. The scraping is then continued until another layer of fibre is exposed, and this in turn is lifted away. The process continues until all the fibres of the leaf are separated out. As the fibre is separated it is washed in clear water, and laid out in the sun to dry and bleach. The washing and drying may be repeated until the fibre possesses the texture and whiteness desired.

A mature plant has about forty leaves from $1\frac{1}{2}$ to 3 inches broad and ranging from 2 to 5 feet long. In the provinces of Iloilo and Antique, where pine-apple plants are grown largely for their fibre, a ton of leaves, about 22,000, produces from 50 to 65 lb. of dry fibre. This is a small yield when we take into consideration the number of leaves which have to be handled and the labour of extracting the fibre. Before the pine-apple fibre can become a very important commercial product, machines will have to be devised for extracting the fibre on plantations more extensive than those worked at present. Two machines have been used, the Van Buren and the Sanford Mallory, but they have not yet been able to produce a quantity of fibre sufficient to make their use economical.

The pine-apple fibre has not yet been produced in quantities sufficient to give it commercial importance. But no doubt it is destined to a more extensive use than at present, as it possesses unique qualities. The fabrics called 'piña' and 'rengue,' manufactured from it here in the Philippines, are constantly becoming more popular in both Europe and America, and there is a growing demand for these fabrics for embroidery. The rengue and piña are now valued at from 25 to 75c. per yard, and the fibre in the London market has been adjudged worth £30 per ton.

The fibre is also used for small cordage where great strength is required. In Calcutta a rope $3\frac{1}{4}$ inches in circumference was tested and bore a strain of 5,700 lb. It has been suggested that the dried leaves from the fruit plantations could be used for paper stock, but as yet no trials along this line have been made.

INSECTS AND DISEASE.

The following is a further extract from Sir Patrick Manson's lecture at the West India Committee Rooms on the disease problem in the West Indies:—

From what I have said you will be struck with the importance of the rôle played by the mosquito in the diffusion of tropical disease. In truth, take away mosquitos, and the tropics would be as healthy, if not healthier, than England. The fact of the matter is that it is only now we are beginning to recognize that nearly all the grave diseases of the tropics, and some of the grave diseases of temperate climates, are conveyed by the instrumentality of mosquitos, flies, ticks, fleas, and certain other small deer with names not to be mentioned in polite society. It is a humiliating confession to have to make, but is nevertheless true, that until lately man was not the lord of creation; the flies that buzzed about him or the fleas that he carried on his person were his masters. We now begin to apprehend the rationale of cleanliness, of how it conduces to health. Dirt means vermin—vermin which bite, and by their bite transfer other and more deadly vermin. And not only is this the case as regards man; it is equally the case as regards the domestic animals. Thus the germ of a virulent cattle disease common in many parts of America, of the Cape, of Australia, and even of the south of Europe, is passed from cow to cow by the cattle tick. Nature rarely loses an opportunity of fostering parasitic life. The opportunity supplied by the habits of the blood-sucking insects is one which she has not neglected. She sometimes seems to go a long way out of her usual direct and simple course in order that so good an opportunity be not lost. Thus certain blood-sucking creatures, like the ticks, feed only once, and so cannot directly transfer disease germs from animal to animal. To get over this difficulty in the case of the ticks, nature has arranged that the disease germ shall pass into the egg of the mother tick and thus into the blood of the cow the young tick feeds on. There is a devilish sort of ingenuity in this utilization of blood-sucking insects in the conveyance of disease germs: it looks like design, but surely design of a vindictive order.

SISAL HEMP IN QUEENSLAND.

The following note on the cultivation of sisal hemp in Queensland is taken from the *Textile Mercury* of April 23:—

A sample of sisal hemp, grown at St. Helena, was recently forwarded to Messrs. James Miller and Co., Melbourne, by the Queensland Department of Agriculture. Messrs. Miller have expressed a high opinion of the sample, and stated that there is a demand for at least 2,000 tons yearly, the value of which would range from £30 to £35 per ton, according to quality.

Sisal hemp is now being grown in Queensland, and £30 to £35 per ton is the market price obtained. It is estimated that 2,000 tons a year can be disposed of in Australia itself, where it might be largely used for the manufacture of binder twine. Sisal is practically a modern fibre, and in Messrs. W. F. Malcolm and Co.'s hemp report for last year the consumption is put down at 610,000 bales—an increase of 74,000 bales on the previous year. Manila and New Zealand hemps are just now very high in price, and as the world's demand for fibre is somewhat greater than the production, there may well be a good opening for the production of this article in Queensland.

SCIENCE NOTES.

Red Sorrel and Surinam Cherry.

In *Farmers' Bulletin* No. 169, of the U. S. Department of Agriculture, there is an article on some tropical and sub-tropical fruits, from which we extract the following information relating to the red sorrel (*Hibiscus Sabdariffa*) and the Surinam cherry (*Eugenia uniflora*)—two plants widely cultivated in these islands :—

The roselle, or Jamaica sorrel, is the fruit of *Hibiscus Sabdariffa*, a widely distributed tropical plant, which yields the roselle fibre of commerce. As grown in Florida and California it is an herbaceous annual. The plants are grown from seed in spring, and require a long season free from frost to mature. Under favourable conditions they produce a very heavy, continuous crop of blossoms in the latter part of the summer and autumn. The fruits, which somewhat resemble okra or gumbo in form, though they are much shorter in proportion to their size, are a dark magenta red in colour and are used for making jellies and preserves, which are of a beautiful red colour and have a flavour suggesting that of the cranberry. The thick, juicy, dark-red calyxes are the only portions used, and these are at their best soon after the petals fall. If the harvest is long delayed, the enlarging ovary forms too large a proportion of the product and lessens its value by detracting from the flavour of the jelly or preserves. Roselle jelly is now on the market, though it is not very common.

The Surinam cherry, sometimes called pitanga, is the fruit of a tropical shrub, native to Brazil and other tropical regions of South America. This shrub, which attains a height of about 20 feet, is grown to a limited extent in southern Florida and southern California. The fruit is about the size of an ordinary cherry, is roundish oblate in form, ribbed, bright red in colour and of a sharp, but pleasant, acid flavour. It is somewhat used for domestic jelly making, but the product has not yet attained commercial importance, at least in the United States.

On an average, the roselle is made up of about equal proportions of pods and calyx. The edible portion of the Surinam cherry constitutes some 83 per cent. of the entire fruit, and the stems and stones together some 17 per cent.

The average composition of these fruits is as follows :—

	Water.	Protein.	Fat.	Carbohydrates.	Ash.
Surinam cherry	85·0	·4		(*a*) 13·2	·7
Roselle :					
Calyx	86·5	2·1	·3	10·3	·8
Pod	84·0	1·7	1·0	12·2	1·1
Extract from calyx	91·2	·9		(*b*) 7·2	·7
Extract from pods	93·7	1·5		(*c*) 4·2	·7

(*a*) Including 10 per cent. invert sugar, 10·1 per cent. total sugar.
(*b*) Including 1·6 per cent. sugar.
(*c*) Including 1 per cent. sugar.

The Surinam cherry and roselle do not differ materially in chemical composition from more common fruits. The total quantity of nutritive material is small in proportion to the bulk, while the proportion of water (juice) is large. These fruits are generally regarded as palatable and are of value in adding to the variety and attractiveness of the diet.

The Pomegranate.

The pomegranate (*Punica granatum*) is a native of North-west India, but cultivated in most tropical countries.

The tree is small and of a somewhat straggling habit ; the flowers are crimson.

Fig. 8. Punica Granatum.
[From *Kew Guide*.]

'Pomegranates are greatly valued in warm countries on account of their delicious, cooling and refreshing pulp. Numerous varieties are grown, some being sweet and vinous, and others acid or of a bitter astringent taste ; and the colour of their pulp is much redder in some than in others. They are generally about the size of the fist, and have a tough, leathery rind of a beautiful, deep, golden colour tinged with red, and are crowned with the remains of the calyx-lobes. The rind, especially that of the bitter kind, contains a large quantity of tannin, and is used for tanning the celebrated morocco-leather, and also as an astringent medicine ; the flowers likewise yield a red dye.' (*Treasury of Botany*.)

A GARDEN OF MEDICINAL PLANTS.

American Gardening of April 16 has the following account of the interesting exhibit of medicinal plants at the Louisiana Exposition :—

One of the features at the Louisiana Purchase Exposition is the outdoor exhibit of the office of Drug and Medicinal Plant Investigations of the U. S. Department of Agriculture, made under the direction of Rodney H. True, Physiologist-in-charge.

This exhibit comprises growing specimens of various medicinal plants, some of them native species which are gradually becoming scarcer and therefore more valuable, some simply ordinary weeds that can be picked up on almost any farm, for which, however, there is considerable demand. A few foreign drug plants, of which we are now importing large quantities, and which could be cultivated in this country as well as abroad, are also introduced. The area devoted to medicinal plants consists of a strip of land 180 feet long by 40 feet wide. This is laid off in forty-seven plots, each measuring about 13 feet in length by 7 feet in width, with walks between the beds affording easy access to the plots for purposes of closer scrutiny and examination. The labels give the common and scientific names of the plants, the parts employed in medicine, and their properties.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 175 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, MAY 21, 1904. No. 55.

NOTES AND COMMENTS.

Contents of Present Issue.

Among the articles in this issue of the *Agricultural News* the following may be referred to as of particular interest:—

On pages 162-3 will be found the concluding portion of the progress report on the sugar-cane experiments at Barbados. The instalment of this report published in the last issue dealt particularly with the manurial experiments at Dodds and Hopewell. In this issue the report deals with experiments with tillage and gives a detailed list of the experiments inaugurated during the period under review.

An interesting note on the method of tinning pine-apples, as practised in the Straits Settlements, is given on page 164, where there will also be found a further extract from Mr. Smith's report to the Trinidad Agricultural Society on the Fruit Industry of Jamaica. Mr. Smith's report deals principally with the banana industry: the remarks given here refer to the trade in other fruits.

Under 'Cotton Notes' will be found references to the opening of a Central Cotton Factory at Grenada and to proposed cotton experiment plots at St. Lucia. We also publish an interesting extract from Sir George Watt's lecture on the Improvement of Cotton. This extract deals particularly with the history of cotton in the West Indies.

The short extract on page 166 describing the methods adopted in the Philippines for the extraction of pine-apple fibre is likely to be of interest as indicating a possible new industry for the West Indies.

In the article on Paris green and London purple a brief comparison is given between these two insecticides, either of which might be used for the cotton worm. On the whole, however, better results are likely to be obtained from the use of Paris green.

Exports of Northern Nigeria.

According to the *Colonial Report on Northern Nigeria* for 1902, the principal exports are rubber, shea nuts and shea butter, palm kernels, ivory, gum arabic, wood oil, and ground nuts.

Shea butter is the product of a tree known as *Butyrospermum Parkii*, belonging to the natural order *Sapotaceae*. The value of the exports of shea nuts and shea butter amounted in 1902 to £15,205, against a total of £32,651 in the previous year. The failure was due entirely to natural causes, and the crop is expected to recover itself.

The exports of rubber were valued at £21,927, of palm kernels at £10,481, and ground nuts at £1,958.

A Stitch in Time.

Those about to plant cotton are advised to take precautions in good time to secure supplies of Paris green and lime in order to destroy the caterpillars which attack cotton.

The proportions to be used are 1 lb. of Paris green and 6 lb. of slaked lime. These are to be dusted on the cotton plants directly the worms appear.

Local merchants are being asked to import and keep in stock the necessary supplies of Paris green and lime, from whom cotton-planters can purchase at reasonable rates and to whom they are advised to make known their wants at an early date.

Cotton-planters are earnestly urged to provide themselves with supplies of Paris green and lime long before the caterpillars are due to make their appearance: it is only in this way that attacks can be quickly met and the best results obtained from the industry.

Fodder Grasses for West Africa.

The *Bulletin of the Imperial Institute*, Vol. II, no. 1, contains an interesting article on the above subject. The particular problems to be solved in the case of West Africa are, it is stated: 'The provision of fodder during (1) the wet season, and (2) the dry season, the latter being either ensilage, hay, or grasses which yield crops during this time. The plants to be employed must perforce be either native or introduced, but in the first instance attention should be directed to the former.'

Notes are given of the more important fodder grasses recorded from West Africa, where many of them are already held in high esteem. The list includes:—Guinea grass (*Panicum maximum*), 'the most important for general purposes'; Para grass (*Panicum muticum*), a 'permanent grass for swampy localities'; Barbados sour grass (*Andropogon pertusus*) and Jamaica pimento grass (*Stenotaphrum americanum*), for dry regions and on poor soils; Bahama grass or devil's grass (*Cynodon dactylon*), Jamaica sour grass (*Paspalum distichum*), sugar-cane (*Saccharum officinarum*), etc.

Notes, drawn largely from the *West Indian Bulletin* and the *Bulletin of the Department of Agriculture of Jamaica*, are given as to the value of these and other grasses as fodder.

Exports of Dominica.

It will be of interest to have on record the following summary of the principal items of export from the island of Dominica during the year 1903:—

Bay leaves, 174 bales, valued at £783; logwood and divi-divi, 34 cords (£68); fresh fruit to the value of £4,501; preserved fruits (including tamarinds and pickled limes), 762 barrels, of the value of £322; lime juice (raw), 129,316 gallons, valued at £4,849; lime juice (concentrated), 6,670 gallons (£14,175); essential oils, 3,081 gallons, of the value of £1,544; sugar (crystallized) 225 tons, valued at £1,890.

The exports of fresh fruit included bananas, cocoa-nuts, limes, mangos, pine-apples, etc.; and the essential oils, bay, lime and orange. The bay oil (valued at £35) was, however, not the product of the island.

Vanilla in Pondichery.

An article, by M. A. Block, in the March-April issue of *L'Agriculture pratique des Pays Chauds*, 1904, gives an account of the trial cultivation of vanilla in French India.

The plant was first introduced to the Colonial Garden at Pondichéry in 1879 from Réunion, the area planted being about 15 ares (rather more than $\frac{1}{3}$ acre). The area was gradually increased, until in 1901, 3 hectares 77 ares (about $9\frac{1}{2}$ acres) were under cultivation.

The author points out that the cultivation in Pondichéry must be considered an artificial one owing to the unfavourable conditions of soil and climate. Vanilla requires a porous, friable soil, rich in humus, and frequent but moderate rains. In Pondichéry the soil is clayey and for eight months (March to Octobe there is practically no rain, while torrents November to February. The cultivation can s be maintained only by constant care and attention, d by reducing the number of flowers pollinated to a minimum.

Cotton growing in British Guiana.

Correspondence has recently been published in the Demerara press between Mr. E. R. Davson and Dr. Rowland, the honorary secretary of the Berbice Cotton Growers' Committee.

The policy of the committee has been to encourage cotton growing among the peasant proprietors, as stated by Dr. Rowland, 'in much the same way as the coolie grows rice, ... and they have only asked the planter to cultivate an acre or so, just as an example to the farmer.'

In his letter to Dr. Rowland, Mr. Davson remarks that it is a moot point, whether cotton growing should be developed on the large plantation or the small proprietary system, and states that, with a view to settling the point he is having 5 acres planted in cotton on Providence and Bath estates. This will be cultivated on ordinary estate conditions, and will enable sufficient reliable data to be obtained to decide whether cotton is a suitable crop to be taken up on a large scale in the colony.

We have on several occasions expressed the opinion in the *Agricultural News* that it is desirable that experiments in cotton growing—as in the introduction of any new industry—should, in the first instance, be conducted only by experienced and skilful planters. It is only in this way that we can arrive at reliable data, as to cost of cultivation, yield, etc., which must necessarily be obtained before the industry can satisfactorily be established, and which can be published for the information and guidance of others.

The Culture of Grapes.

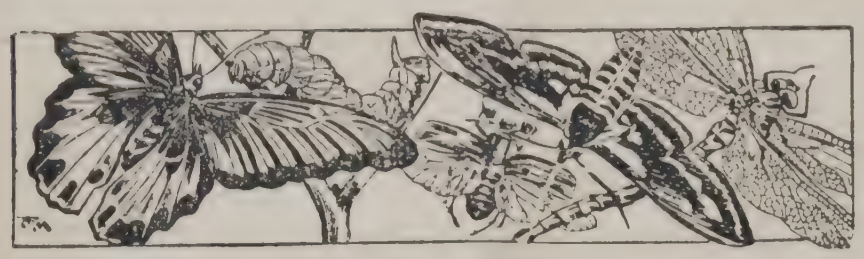
The *Bulletin of the Department of Agriculture of Jamaica* for March contains the report of a lecture on grape vine culture by the Rev. Wm. Griffith, an ardent horticulturist in Jamaica. The lecture, which was one of the recent course for elementary school teachers, contains many valuable hints on this subject which are likely to be of interest to some of our readers, and we therefore make the following brief summary:—

The grape vine succeeds well in low-lying situations near the sea. Vines are raised in a variety of ways—from seeds, layers, single buds, and cuttings. The custom in Jamaica is to grow from cuttings with two buds planted firmly in light soil so deeply that the bud just peeps above the surface of the soil. It is a good plan, when the young vine has reached about 8 to 10 feet, to cut off about a foot of the top and so restrict the future growth, keeping both leader and laterals regularly pinched back.

As a rule the question of the next year's crop is settled a year ahead. Pruning does not give fruit, it only settles its method of distribution over the surface of the vine. Two systems of pruning prevail—one is the close or spur pruning, and the other is to leave from two to three buds on the cane when pruning in spring. The latter plan gives larger and looser clusters, and less thinning is required. The proper time for pruning in Jamaica is between the end of January and the middle of March. If the season is dry and warm, the commencement of pruning may usefully be delayed. After pruning water should be given very sparingly until the buds begin to push, when a copious watering should be given.

The next important duty is thinning out the young grapes as soon as possible after the fruit has set. Some varieties, such as Muscat of Alexandria and Muscat Hamburg, give little trouble in this direction, but Gros Colman and many others require from 50 to 70 per cent. of the set berries to be thinned out.

With regard to the varieties to be grown there is a wide range for choice. Muscat of Alexandria is a universal favourite. More vines of this variety are grown in Jamaica than of any other. It is by far the best mid-year and late grape in cultivation. Where grapes are grown simply for home consumption, and only one vine can be grown, the Muscat of Alexandria should be selected. Where there is room for two or more vines, Foster's White seedling, for early use, and Lady Downe's Seedling or Alicante, for late supply, would be serviceable.



INSECT NOTES.

Grenada Maribunta.

The usefulness of the Grenada Maribunta (*Polybia occidentalis*) is mentioned in the *Agricultural News* (Vol. I, p. 200). A mass of these insects hanging to a palm leaf was recently captured in the Botanic Gardens at Grenada. They were probably swarming, as honey bees swarm when they start to establish a new nest. A swarm, or colony, of these insects contains three kinds of individuals—queens, workers and males. The adults feed their young on insects, generally caterpillars, which they partially masticate for them.

Sugar-cane Leaf Hopper in Hawaii.

In the last issue of the *Agricultural News* we published a brief note on the occurrence of this pest in Hawaii. In the Bulletin there referred to as having been issued by the Hawaiian Commissioners of Agriculture and Forestry, an interesting account is given, as an appendix, of the chemical treatment of seed-canes containing eggs of the leaf hopper, with a view to destroying these without injury to the cane. The following is a brief summary of the experiments which were carried out by Mr. C. F. Eckart, the Director of the Experiment Station at Makiki :—

The chemicals employed in these experiments were hydrocyanic acid gas, corrosive sublimate, and carbolic acid, and the relative resistance of the eggs of the leaf hopper to these was clearly shown. Sections of cane, 8 inches long, were cut from badly affected first-year canes, only such portions being taken as bore evidence of hopper eggs having been recently deposited.

The canes were divided into eight lots and treated with corrosive sublimate solution, in various strengths for varying periods ; with carbolic acid, in various strengths for varying periods ; fumigated with hydrocyanic acid gas for twenty-four hours ; finally one lot was left untreated.

After this treatment the canes were placed in boxes with tight-fitting glass tops, and the young hoppers which hatched out were counted at intervals.

The various solutions of carbolic acid were found ineffective in destroying the eggs. The effect of the other chemicals will be seen from the fact that, although after nineteen days a total of 200 hoppers had hatched from the untreated canes, only one had hatched from the canes treated with corrosive sublimate and one from the lot fumigated with hydrocyanic acid gas.

A further series of tests was carried out to note the effect of fumigating canes for varying lengths of time, and of merely dipping canes in corrosive sublimate instead of soaking. The gas was found to be very effective in destroying the eggs when the canes were fumigated for periods of six hours and over : treatment for three hours was insufficient. The corrosive sublimate treatment appeared to be most effective when a 2 per cent. solution was used.

Further tests to note the effect of the different treatments on the germinating power of the canes showed, however, that the length of time that the cane was in contact with the gas had a marked effect on the vitality of the eye. On the other hand, corrosive sublimate appeared to exercise no such injurious influence.

The conclusion is, therefore, that the corrosive sublimate solution is the most useful agent, since it destroys the eggs and does not affect the germinating power of the cane.

Paris Green and London Purple.

During the last cotton-growing season Paris green and London purple were recommended in the *Agricultural News* for use in combating the cotton worm. It may be of interest to our readers to have a comparison of these materials to help in deciding which of them to use.

London purple and Paris green are both arsenical poisons ; that is to say, arsenic is the killing agent, and their value as insecticides depends largely on the amount of this element they contain. They are known as stomach poisons, that is, they are effective only when taken into the stomach with food.

Paris green is a chemical compound of arsenic, copper and acetic acid, and the higher the percentage of total arsenic and the lower the percentage of free or uncombined arsenic or arsenious acid, the better the insecticide. This is because, as already stated, the killing value of Paris green depends on the proportion of arsenic compounds, and because uncombined arsenic is almost certain to scald the leaves of the plants to which it is applied.

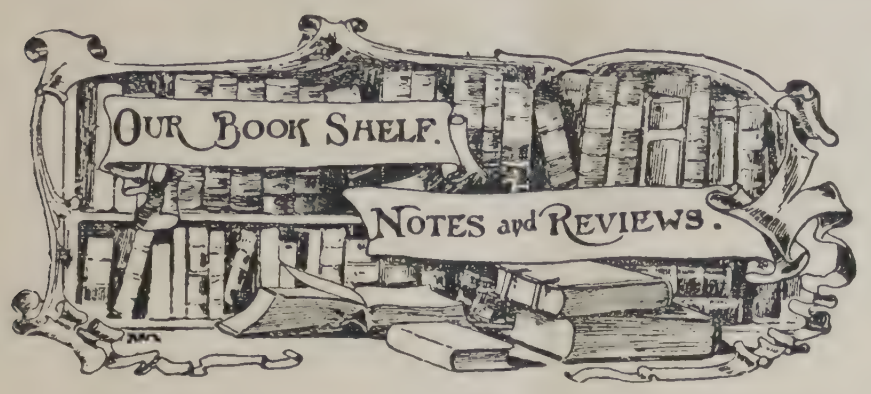
London purple is a chemical compound of calcium and arsenic, and is much more variable in composition than Paris green. It is also much more finely divided and much lighter. It contains a lower percentage of total arsenic and, generally, a considerably higher percentage of uncombined or soluble arsenic, and this would have the same burning effect as in the case of Paris green.

The fact that London purple is much lighter than Paris green and remains in suspension much longer is in favour of London purple when used in spraying operations ; further, its cost is slightly less. On account, however, of its lower arsenic content, a larger amount will be required to do a given amount of work.

In using either Paris green or London purple as a spray, quick lime should be added to the mixture, equal weights of lime and poison being used. The free arsenic combines with the lime and is thereby rendered harmless to the leaves, while it retains its killing properties as a stomach poison. When dusted on to the leaves in a dry state, mixed with lime at the rate of one to six, neither of these poisons is likely to cause any serious injury to the plants. It is recommended in spraying operations that the mixture be made up and allowed to stand for from six to ten days before being used, and stirred every day : this gives time for the lime and arsenic to combine. For the same reason it would probably be equally advantageous to mix the poison and dry lime for dusting a few days before using.

Briefly stated, then, the characteristics of Paris green and London purple are as follows :—

Paris green.	*London purple.*
Rather heavy.	Light in weight.
Coarse.	Finely ground.
Settles quickly in water.	Remains in suspension.
High total arsenic content (56 to 60 per cent.).	Low total arsenic content (35 to 44 per cent.).
Low free arsenic content (usually about 6 per cent.).	Comparatively high free arsenic content (up to 15 per cent.).
Uniform in composition.	Variable in composition.



VEGETABLES AND FLOWERS FROM SEEDS IN TROPICAL, SEMI-TROPICAL AND TEMPERATE CLIMATES: Reading, England: Sutton & Sons. Price 5*s.*

The preface to this work refers to the craving of Europeans in distant lands for English vegetables and flowers. Many of these can be grown in every country of the world: others cannot be grown with any hope of success, except in certain favourable localities. The writers give in this useful handbook of horticulture information as to the requirements of the principal flowers and vegetables, which, it is hoped, will go far towards minimizing failures, as well as loss of time and money in profitless experiments.

We feel sure that this work, which has had an excellent reception among horticulturists in England, will be found particularly useful to gardeners—both professional and amateur—in these colonies, where experiments with English vegetables and flowers are so frequently attempted, which, through insufficient knowledge as to the requirements of the plants, often meet with but little success.

The growing of English flowers and vegetables has been frequently referred to in the *Agricultural News*, and it is probable that many persons, who have attempted the culture of them, will find much of value in Messrs. Sutton's latest handbook. The book is well got up and contains a very large number of good illustrations.

FLOWERING PLANTS AND FERNS: By J. C. Willis, M.A., Director of the Royal Botanic Gardens, Ceylon. Second Edition, revised and re-arranged in one volume. *Cambridge: The University Press, 1904.* Price 10*s.* 6*d.*

The first edition of this work was published in 1897 in two volumes and supplied a long-felt want for a dictionary in a small, handy form for students of botany. From students of economic botany, travellers in the colonies and others, it received a hearty reception.

The author states in the preface to the new edition that he has found that the division of the work into two volumes was a mistake; therefore, the whole is now combined in one volume, the first part being shortened as much as possible. On the other hand, a large quantity of new and valuable matter has been added and various other alterations have been made to render the work as complete as possible as a work of reference for botanical students.

Chapter IV ('Economic Botany') gives a useful summary of the principal products of the vegetable kingdom with a list of the principal plants cultivated for these different products. The chapter on the geographical distribution of plants is also of considerable interest.

We have much pleasure in giving a hearty welcome to this new edition of a work which we can without any hesitation recommend. Curators of Botanic Stations and lecturers in agricultural science in the West Indies, as well as all others who are interested in botany in these islands, will find Mr. Willis' work extremely useful for purposes of reference.

DEPARTMENT NEWS.

With the approval of the Secretary of State for the Colonies the Imperial Commissioner of Agriculture will be absent on duty in the United Kingdom from June 4 next.

During the absence of the Commissioner, Professor d'Albuquerque, M.A., F.I.C., F.C.S., will be authorized to sign official correspondence.

The Imperial Commissioner of Agriculture proceeded on a tour in the Southern Islands on Monday, May 9. He landed at St. Vincent and visited the Central Cotton Factory which was working in a satisfactory manner. He afterwards proceeded to Grenada landing there on Tuesday, May 10. He was present at the opening of the Cotton Factory, erected by Mr. L. R. Mitchell, on Thursday, May 12, and attended the inaugural meeting of the Grenada Agricultural and Commercial Society (his Excellency Sir Robert B. Llewelyn in the chair) and delivered an address. On the return voyage Sir Daniel Morris took part in a conference of the cotton growers of St. Vincent held in the Council Chamber (his Honour the Administrator in the chair) on Saturday, May 14. He landed at Barbados early on the morning of the 15th.

Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, proceeded to St. Vincent on May 9. During his visit to that island, he inspected the work carried on at the Agricultural School and the Experiment Station attached to it; also the Botanic Station and the conditions of the plants and the collections and nurseries, in respect of their freedom, or otherwise, from fungoid pests. Mr. Lewton-Brain returned to Barbados on May 15.

Mr. Henry A. Ballou, B.Sc., the Entomologist on the staff of the Imperial Department of Agriculture, proceeded to Grenada on May 9. He devoted special attention to the presence of 'thrips' on cacao trees and visited estates in St. Andrew, where thrips had been reported to be present. Mr. Ballou also studied the prevalence of 'black blight' at Grenada with the view of offering further suggestions for dealing with it. The results of Mr. Ballou's visit will be dealt with later. He returned to Barbados on May 15.

Dr. Longfield Smith, Lecturer in Agricultural Science at Harrison College, Barbados, in connexion with the Imperial Department of Agriculture, who has been delivering a course of lectures on agricultural science to teachers in elementary schools in Bermuda, returned to Barbados in S.S. 'Ocamo' on May 12.

Mr. George S. Hudson, Agricultural Instructor at St. Lucia, was a passenger on the R.M.S. 'La Plata' for England on leave of absence. During Mr. Hudson's absence, Mr. G. A. Deveaux will act as Agricultural Instructor.

GLEANINGS.

The Central American rubber tree is flowering for the first time in Montserrat, at the Harris Station.

The United States Agricultural Appropriation Bill, as finally passed both houses, involves a total expenditure of $5,902,040. (*American Gardening*, April 16, 1904.)

Four and three quarter pounds of vanilla beans cured at the Agricultural School at Dominica have been received by the Imperial Commissioner of Agriculture. The beans are extremely well cured, and altogether the sample is a very satisfactory one.

At the usual monthly meeting of the Jamaica Board of Agriculture held on April 12, it was reported that orders for 6,900 lb. of cotton seed had been received and further orders were being received daily. Half a ton of seed had therefore been cabled for.

It is notified in the Grenada *Gazette* that his Excellency the Governor has appointed Mr. W. E. Broadway, Curator of the Botanic Station, to be the authority to determine whether any plants, vegetables and fruits, intended for importation into the colony, are diseased.

Mr. John Belling, B.Sc., writes from St. Kitt's advising those planting roses to choose, if practicable, the varieties recommended by Mr. Cousins as most suitable for Jamaica (see *Agricultural News*, Vol. II, p. 260). Most American florists supply them at 10c. each.

Mr. A. J. Jordan, Curator of the Botanic Station at Montserrat, reports results of experiments to test the best varieties of sweet potatos for the island. The varieties giving the best results were 'Caroline Lea,' 'Mama,' 'Red Bourbon,' 'White Gilkes,' and 'Playwell.'

According to a report furnished by Messrs. Ide and Christie, the well-known Fibre Brokers of London, the average prices per ton of sisal hemp during the last seven years has been as follows: 1897, £16 6*s.* 8*d.*; 1898, £27 18*s.* 4*d.*; 1899, £34 4*s.* 2*d.*; 1900, £35 8*s.* 4*d.*; 1901, £32 11*s.* 8*d.*; 1902, £43 1*s.* 8*d.*; 1903, £36 6*s.* 8*d.*

In reference to the note in the *Agricultural News*, Vol. III, p. 156, respecting the hand-power cotton gin at the Agricultural School at St. Lucia, the St. Lucia *Gazette* contains a notice inviting growers of Sea Island cotton to make use of the gin. Application is to be made to the Agricultural Superintendent, who will explain the conditions under which permission may be granted for the free use of the gin.

Mr. W. E. Broadway writes that the so-called Asparagus fern (*Asparagus plumosus*) is fruiting at the Government House grounds, Grenada. Each fruit is green-coloured, containing a hard, round, black seed. Young plants are springing up spontaneously around the mother plant.

The Imperial Commissioner of Agriculture has been informed that the Board of Directors of the West India and Panama Telegraph Co., Ltd., has decided to resume quoting in the public telegrams 'middling Upland cotton' as well as Sea Island cotton.

A silver challenge medal has been presented by the Trinidad Agricultural Society for competition among the schools of the colony at the school shows. The medal was won this year by the Couva Government school, and it was handed to the winner by his Excellency the Acting Governor on May 9.

Arrangements have been made for lectures and demonstration lessons on agricultural science for elementary school teachers in British Guiana. Teachers who have passed the examination in agricultural science will have an opportunity of attending a class for practical work in the Bourda School Garden and a course of demonstration lessons at the Government Laboratory. Lectures in agricultural science will also be given in Essequebo and Berbice.

Efforts are being made in Jamaica to develop the sheep-breeding industry. A large number of sheep are annually imported for the use of the troops. It is thought that sufficient sheep should be raised locally to supply this demand. The Agricultural Society has taken the matter in hand, and the Secretary is endeavouring to obtain information from sheep breeders as to the size of their flocks and the number of fat sheep they are likely to have for sale.

In the annual report on the sanitary condition of St. Kitt's-Nevis, Dr. Fretz states: 'Filariasis is an affection extremely prevalent in this presidency. As far as is known, the only cause of the distribution of malaria and filaria is the mosquito special to each disease, and as the subject is being made known far and wide, it it reasonable to expect that in the near future these diseases may become very much less common.'

According to a pamphlet on wheat growing in Canada, recently issued by Dr. Wm. Saunders, Director of the Canadian Experimental Farms, it is estimated that there are 171 million acres of land fit for settlement in Western Canada, of which 5 millions are now under cultivation. The present production of wheat and other grains is estimated at 125 million bushels, and the possible wheat production at 800 million bushels.

The Jamaica *Leader* is urging the peasantry to grow castor oil plants. A local soap factory, which has for some years been using cocoa-nuts through inability to obtain castor oil seeds, and which is at present unable to buy cocoa-nuts on account of the hurricane, is now offering 4*s.* a bushel, or 8*s.* 4*d.* per 100 lb., for castor oil seeds. It is pointed out that these might be produced in preference to corn. The oil nut plant bears soon and goes on bearing for several years without re-planting.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following notes on the drug and spice sales in the London Market during the month of March last have been contributed by Mr. J. R. Jackson, A.L.S.:—

In the drug and spice markets little or nothing has occurred during the month to call for any special observation with regard to the chief West Indian products. Interest continues to be centred in camphor, menthol, and other productions of Japan. A few West Indian products, however, such as kola and arrowroot, may be mentioned in regard to the price asked for the first, and with reference to the quality of the second.

KOLA.

Thus, at the first drug auction on March 3, 14 packages of kola were offered, though none found buyers, the prices asked being 3½*d.* per lb. for African, and 7*d.* for fair bright washed West Indian. No other offerings of West Indian were made during the month, but on the 30th. there was a demand for the cheaper qualities of West African at from 4½*d.* to 4¾*d.*, which were almost unobtainable.

ARROWROOT.

With regard to arrowroot, 94 barrels of good manufacturing St. Vincent were disposed of at the sale on March 3, at 1¾*d.* per lb., which price was maintained throughout the month. On the question of the quality of arrowroot, the following paragraph recently appeared in the *Chemist and Druggist*:—'We understand that the public analysts are about to pay attention to arrowroot, and we should not be surprised to hear that some prosecutions are to take place shortly.' It is reported that some of the importers of arrowroot have decided in future to sell the article 'guaranteed genuine as imported' which 'guarantee' is not likely to avail the retailer much. That such a step should have been taken by the importers is evidence that developments may be expected. Chemists may also take the hint, so that when the ambitious inspector walks in they will be able to charge him 3*s.* 6*d.* or 4*s.* per lb. for 'the only genuine' Bermuda arrowroot.

GINGER.

At the first spice sale on the 2nd. of the month, the market was very quiet, 18 packages of ordinary dark Jamaica selling at 37*s.*; washed rough Cochin was bought in at 27*s.* 6*d.* to 30*s.*, and 25 bags of Japanese were disposed of, without reserve, at 23*s.* A week later about 300 packages of Jamaica were offered, of which 14 barrels were sold at the following prices:—Good washed, part wormy, 44*s.*, and dark 33*s.* One case of bold selected Cochin realized 70*s.*, while 350 bags of hard brown rough sold at 28*s.*, fair washed rough 25*s.* to 25*s.* 6*d.*, good 26*s.* to 27*s.* 6*d.*, and rough and wormy brown Calicut 22*s.*, cut tips 34*s.*, and ends 27*s.* 6*d.* On March 23, the quotations were as follows:—Middling dullish Jamaica 41*s.*, common dark to ordinary 33*s.* to 35*s.*, common ratoon 31*s.* 6*d.* and wormy 28*s.* 6*d.* In comparison with these prices fine bold rough Calicut sold at 40*s.*, and cuttings at 21*s.*, bold washed being bought in at 36*s.*: 350 packages of Jamaica were offered and 50 sold, and of 362 packages of Cochin offered, about 40 found purchasers. These prices were generally maintained at the close of the month.

SARSAPARILLA.

At the first drug sale on March 3, 65 packages of sarsaparilla were offered, comprising the following descriptions and numbers of packages:—Grey Jamaica, 10 packages, all of which were sold; Lima Jamaica, 28 packages, none sold; native Jamaica, 19 packages, 2 sold; Honduras, 8 packages, none sold. The following were the prices realized:—Grey Jamaica, firm at 1*s.* 1*d.* per lb.; slightly sea-damaged, 1*s.*,: badly sea-damaged, 7*d.* to 9*d.* Lima Jamaica was held at from 10*d.* to 11*d.*, sales being afterwards effected at 11*d.* The native Jamaica sold at 10*d.*, and the Honduras was held at 1*s.* Grey Jamaica was again offered a fortnight later, fair sound being held at 1*s.* 1*d.*, and a few bales of slightly coarse disposed of at 1*s.* At this same sale 21 bales of fair Guayaquil sold at 10*d.* to 10½*d.*, and 1 bale of Mexican at 4½*d.* taken with all faults.

NUTMEGS, MACE, LIME JUICE, ETC.

The following may be mentioned amongst other less important products:—Nutmegs and mace have maintained a steady sale throughout the month, ordinary to fair West Indian selling at from 1*s.* 9*d.* to 1*s.* 11*d.* per lb., and pickings from 1*s.* 6*d.* to 1*s.* 7*d.* Raw West Indian lime juice was quoted at the end of the month at 1*s.* 1*d.* to 1*s.* 2*d.* per gallon, and West Indian distilled lime oil at 1*s.* 6*d.* per lb. Twenty-four packages of *Cassia fistula* were offered at the first sale in the month, 5 of which were sold at 30*s.* for fair lean West Indian pod. Annatto seed from Ceylon and Madras were offered on March 3 to the extent of 84 packages, 19 of which were sold at from 3¼*d.* to 3½*d.* per lb.

Silk-cotton for Canada.

Mr. J. Russell Murray has written as follows to the Imperial Commissioner of Agriculture, under date Montreal, April 21, 1904, regarding a possible trade in silk-cotton:—

Can you tell me if there is any possibility of obtaining silk-cotton? This is about the time of the year it can be obtained. Have you any idea as to what value it could be gathered for? There is a possible outlet for it here, if it can be gathered in sufficient quantities, and if we can get it at a reasonable price.

A similar product, called 'Kapoc,' is on the market here, offered from New York, at 12½c. per lb., f.o.b. cars New York. It is brought here from Ceylon and Java. I send you a sample.

While we have pleasure in publishing Mr. Russell Murray's letter, it is advisable to repeat what we stated in the *Agricultural News* (Vol. II, p. 151) on this subject: 'As far as we are aware no one has devoted serious attention to this subject. Perhaps one great difficulty is to get at the pods which hang at the ends of slender branches of a lofty tree, 40 to 70 feet from the ground. These pods must be gathered just before they begin to burst. But how? The next difficulty is to find, anywhere in the West Indies, a sufficient number of silk-cotton trees growing near one another to make it worth while to start a business in collecting and exporting the cotton. The seeds must be separated as in the case of ordinary cotton, and the clean lint packed in bales.'

Rainfall at Dominica. According to the official returns recently published, the mean rainfall at Dominica during 1903 was 123·77 inches. The heaviest fall (251·56 inches) was at Middleham; the driest station was Wall House with 79·31 inches. During the month of December no fewer than 41·31 inches fell at Middleham.

MARKET REPORTS.

London,—April 26, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' April 22, 1904; and 'The Public Ledger,' April 23, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 15/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—1/6 to 1/10 per lb.
Bees'-wax—£7 to £7 10*s.* per cwt.
Cacao—Trinidad, 58/- to 68/6 per cwt.; Grenada, 52/- to 59/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 60/- per cwt.; Demerara, 65/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 35/- to 40/- per cwt.
Copra—Trinidad, sundried, £15 17*s.* 6*d.* per ton, c.i.f.
Cotton—West Indian Sea Island, 13½*d.* to 16½*d.* per lb.
Fruit—
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 31/- to 60/- per cwt.
Honey—15/- to 30/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/10; Cake, thin, palish and pickings, 1/- to 1/1 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1*s.* to 1*s.* 3*d.* per gallon; Concentrated, £12 to £13 per cask of 108 gallons.
Lime Oil—1/5 to 1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/8 to 2/3 per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—140's, 6½*d.*; 59's, 2/2 per lb.
Pimento—3⅜*d.* to 3¾*d.* per lb.
Rum—Demerara, 7½*d.* to 9½*d.* per proof gallon; Jamaica, 1/9 to 8/- per proof gallon; Leewards, 7*d.* to 11*d.* per proof gallon.
Sarsaparilla—Jamaica, 8*d.* to 1/1 per lb.
Sugar—Crystallized, 14/9 to 15/6 per cwt.; Muscovado, Barbados, 13/- to 14/6 per cwt.; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£12 7*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/6; Barbados 12/6 per cwt.

Montreal,—April 9, 1904.—Mr. J. Russell Murray. (In bond quotations).

Cacao—Jamaica, 13c. to 13¼c.; Trinidad, 13c. to 13¾c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $28·50; Tobago, $23·00; Trinidad, $27·50; per M. c. & f.
Coffee—Jamaica, medium, 8¼c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb. c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 31c. to 34c.; Antigua, 33c. to 34½c. per Imperial gallon.
Nutmegs—Grenada, 110's, 18c. to 19½c. per lb. c. & f.
Pimento—Jamaica, 8c. to 8¼c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·32 per 100 lb. c & f.
—Molasses, 89°, $1·46½ per 100 lb. c. & f.

New York,—April 29, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¾c. to 13½c.; Jamaica, 10½c. to 12½c.; Grenada, 12¾c. to 13c.; Trinidad, 12½c. to 14c. per lb.
Cocoa-nuts—Trinidads, $24; Jamaicas, $27 to $28 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7¼c. to 8c. per lb.
Ginger—Jamaica, 7½c. to 8c. per lb.
Goat Skins—Jamaicas, 50c. to 54c. per lb.
Pimento—6½c. per lb.
Sugar—Centrifugals, 96°, 3¾c.; Muscovados, 89°, 3 3/16c.; Molasses sugars, 89°, 2 15/16c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 4, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—14c. per gallon (Imperial).
Sugar—$1·60 per 100 lb.

Barbados,—May 7, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·25 to $3·60 per 100 lb.
Cacao—$11·00, to $12·50 per 100 lb.
Cocoa-nuts—$12·00 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $12·00 per 100 lb.
Hay—95c. to 96c. per 100 lb.
Manures—Nitrate of soda, $60·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00.
Molasses—12½c. per gallon (puncheon included).
Onions—Madeira, (bunched) $3·00 to $4·00 ex store; Bermuda, (loose) $1·30 to $1·90, ex Dahomé, per 100 lb.
Potatos, English—Nova Scotia, $2·00; Bermuda, $4·10 per barrel.
Rice—Ballam, $4·65 to $4·75 per bag (190 lb.); Patna, $3·50 to $3·60 per 100 lb.
Sugar—in hhds., 89°, $1·65 (packages included). Dark Crystals, 96°, $2·05 per 100 lb.

British Guiana,—May 5, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 12c. per lb.
Dhal—New, $4·70 to $4·90 per bag of 168 lb.
Eddoes—80c. to $1·08 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—5c. to 6c. per lb., ex store; Garlic, 7c. to 8c.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per lb. (retail).
Plantains—25c. to 50c. per bunch.
Potatos, English—$3·25 to $3·50 per barrel.
Rice—Ballam, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·20 per barrel; $1·00 per bag.
Tannias—$2·28 per barrel.
Yams—White, $1·92 per bag.
Sugar—Dark Crystals, $2·10; Yellow, $2·30 to $2·40; White, $3·00 to $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—May 5, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to Good Red, $12·75 to $13·00; Estates, $12·90 to $13·25 per fanega (110 lb.).
Cocoa-nuts—$20·00 per M., f.o.b., large selected peeled in bags.
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—58c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6¾c. to 7c. per lb.
Copra—$2·75 per 100 lb.
Onions—$2·40 to $2·80 per 100 lb.
Molasses—No quotations.
Potatos, English—$1·70 to $1·80 per 100 lb.
Rice—Yellow, $4·20 to $4·40; White Table, $5·00 to $5·75 per bag.
Sugar—White Crystals, $3·25; Yellow Crystals $2·25; Molasses Sugar, $2·00 to $2·10 per 100 lb.

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'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.)

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 56. BARBADOS, JUNE 4, 1904. PRICE 1*d*.

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Minor Industries at Barbados.

THE Imperial Commissioner of Agriculture addressed a special meeting of Barbados planters on Tuesday, May 31, on the minor industries of the island. His Excellency the Governor presided.

Sir Daniel Morris offered his congratulations to the planters on the very promising outlook for the sugar industry. While the Department had given, and would continue to give, every possible attention to this, their main, industry, it was necessary that they should look around for other industries to supplement it. They would thus be ensuring their prosperity by establishing these industries. There were two or three such industries capable of considerable development—industries for which they might utilize lands not particularly well suited to sugar-cane cultivation. It was of these that he wished to speak that afternoon.

First, with regard to the cotton industry. They had shipped to England about 300 bales, and the result was that they had established a reputation in Lancashire for Barbados cotton—for a cotton which was probably superior to any received from the United States. This was the result of about fifteen months' experimenting. Last season's experience had, in one sense, been unfortunate: this was due to poor seed, their inexperience with regard to the right time for planting, and the cotton worm. Still, he considered that the almost pre-eminent position Barbados cotton had attained should encourage them to increase its production. He hoped that some 1,200 acres would be planted next season, and that should increase their export from 300 bales to something like 1,200 bales.

He would, however, impress upon them that, if they wished to meet with success in these experiments, they must plant suitable land, manure and cultivate highly, and keep a keen lookout for the worm and other pests—in fact, the preparation of the land and the attention devoted to cotton must be just as good as that given to cane. With regard to the cotton worm, he would mention that two firms in the island were pledged to keep on hand ½ ton of Paris green and to sell it at 18c. per lb.

One of the great advantages of this industry was that they could obtain in eight months from cotton a return that would require sixteen months from cane. But the greatest advantage of all was that in Sea Island cotton this and other islands could have an industry specially their own. This was the reason why the Department was advising planters in the West Indies to go in only for Sea Island cotton. It was a maritime plant that would thrive only near the sea. If they were to grow Upland or short-staple cotton, they would soon come into competition with Brazil, Peru, Africa, and other countries, which were capable of enormous development in growing short-staple cotton.

In the case of bananas, again, they had what might be considered a special industry, and one, which might be regarded as fairly well established. The requirements of the banana, viz., fairly strong soil and a sheltered position, limited somewhat the area that could be devoted to its cultivation: yet it was estimated that there were over 5,000 acres of land in Barbados suitable for this crop. So far the industry had been carried on by the Department, which shipped the fruit, arranged for its disposal in England, and distributed the proceeds. The results had been very satisfactory: during the period from January to April last they had shipped 809 large bunches (of which only 2½ per cent. failed to arrive in a perfectly sound condition), and 378 bunches in double crates. The average price paid to the growers for the former worked out at 4*s.* 1½*d.* per bunch; for the smaller bunches 3*s.* 5½*d.* was the average price paid.

Sir Daniel Morris then read a letter he had received from Messrs. Pink and Sons, in which was emphasized the need for uniformity in the size of the packages and of using crates of the exact size of the bunch. We propose to publish this letter in a future issue.

Another industry that appeared to be full of promise was the onion industry. Their experiments last season had not, perhaps, been as successful as they might have wished, but that was to be attributed mainly to a somewhat unfavourable season. The Department had again imported the best obtainable seed from Teneriffe, and, in the case of Barbados, it was proposed to plant about 50 acres.

A further matter mentioned was the raising of good crops of English potatos. The best variety for the West Indies was the Bliss Triumph and seed potatos of this would be obtainable early in September next.

AGRICULTURAL SOCIETIES.

Grenada.

At a meeting of the Grenada Agricultural and Commercial Society, held on Friday, May 13, (the Governor, Sir Robert B. Llewelyn, presiding), the Imperial Commissioner of Agriculture gave an address of which the following is a brief summary:—

He expressed pleasure in being present at what he understood was the first meeting of the newly constituted Agricultural and Commercial Society and wished the Society every success.

The cacao industry, he observed, was of the annual export value of £300,000; spices, £30,000; fruit, £700; kola, £250; sugar, £270; making a total of £331,220.

Owing to the very considerable demand on his time in other islands, not so fortunately placed as Grenada, he had not visited them often during the past year. His interest, however, had not slackened, and now that the local Agricultural Department was likely to be re-organized, his visits would be more frequent.

As far as the Imperial Department of Agriculture was concerned, it was his desire to maintain and extend its usefulness by every possible means in Grenada.

The experiment cacao and other plots started by the Department and worked under its direction by the travelling Agricultural Instructor, had been maintained for four years and he was satisfied that they had proved of considerable value both to large and small cultivators. It was now proposed to start a new series of such plots and carry them on in co-operation with an Agricultural Experiments Committee to be appointed by that Society.

Sir Daniel regretted that no Agricultural Show had been held at Grenada since February 1902 and that the grant offered by the Department had been allowed to lapse. He suggested that district committees might be appointed to undertake arrangements for a Show to be held early in 1905.

In regard to cotton, he congratulated the island on the opening of Mr. L. R. Mitchell's cotton ginnery at St. George on the previous day. In the southern districts of the island cotton was likely to do well, and it was also possible to develop very considerably the interesting cotton industry carried on for so many years by settlers at Carriacou.

In conclusion he pointed out the desirability of starting an Agricultural School to afford a thoroughly practical training in agriculture to the youth of Grenada; and he specially urged the importance of successfully carrying on the school gardens already attached to some of the elementary schools in the colony.

SUGAR INDUSTRY.

Sugar-cane Experiments in Cuba.

In the last volume of the *Agricultural News* (p. 179) we published the results of some experiments with new canes in Cuba, kindly furnished by Mr. Edwin F. Atkins, the proprietor of Central Soledad, one of the largest sugar plantations in that island. In forwarding the results obtained this year, Mr. Atkins has written to the Imperial Commissioner of Agriculture as follows:—

I enclose table of our examination of experimental canes, cut in February, which may interest you. The past season has been a dry one and may in part account for the high density of the juices. The one seedling that we have been able to bring to maturity, namely, Harvard 208, is a cross between a Crystalline and a Ribbon cane, and the first examination, as you will note, shows a very satisfactory result.

You will note by the table that some of your Barbados seedlings, as well as the D. 95, gave the highest polarizations and purity, your B. 208 leading in this respect, but being deficient in juice as shown by extraction. All these canes were ground under the same conditions in a small experimental mill operated by a belt from the main shafting of the machine shop. The 'Caledonia Queen,' of which we now have quite a fair-sized plot from the third planting, promises very well.

EXAMINATION OF EXPERIMENTAL CANES, 1904.

Origin.	Name.	Extraction.	Per cent.		Quotient of purity.	Condition of Canes.
			Solids.	Sucrose.		
Cuba	Harvard 208	66·70	18·10	17·20	95·00	Healthy
Barbados	Cal. Queen	64·00	17·70	16·10	91·00	,,
,,	B. 109	54·50	19·10	16·80	88·00	,,
,,	B. 156	61·90	20·10	18·10	90·10	,,
Queensland	Meira	66·65	19·50	17·50	89·80	,, first plant poor
	Red Cavengerie	68·75	16·40	12·20	74·40	Healthy
Queensland	Dan'l Dupont	60·02	19·80	16·40	82·80	,, thin
,,	White Bamboo	70·00	18·70	15·90	85·00	,,
Barbados	B. 208	57·87	21·50	20·40	94·90	Healthy (short 2nd. plant)
Demerara	D. 95	60·00	21·40	20·00	93·40	Fair, badly sprouted
Louisiana	La. Purple	63·16	19·40	18·10	93·40	Healthy, rather weak
Barbados	No. 147	62·50	20·60	18·70	90·80	Healthy
Cuba	Cinta Morada	60·19	19·90	18·90	94·90	,,
Barbados	White Transparent	60·00	19·80	18·60	93·90	,, 2nd. plant poor
Java	Gen. Zambourt 96	61·53	18·10	16·50	91·20	Slightly sprouted
,,	Gen. Zambourt 100	70·00	18·30	16·60	90·70	Healthy, short
Cuba	Black Mt.	58·33	19·00	15·50	81·60	Thin, badly sprouted
,,	White	66·66	17·10	15·00	87·70	Poor
Jamaica	——	68·96	17·60	15·00	85·20	Slightly sprouted
Cuba	White	65·52	19·70	18·00	91·40	Poor
,,	Sitiera	62·50	20·50	19·10	93·20	Healthy
Barbados	B. 2,885	58·33	20·10	17·70	88·10	,,
Queensland	Black Fiji	66·67	18·00	14·80	82·20	,,
Barbados	B. 3,381	60·00	21·10	18·60	88·10	,,
Mexico	Cinta	57·10	20·10	18·70	93·40	Poor, very short
Barbados	Ducumi B	62·50	18·40	16·80	91·40	Healthy, short
Hawaii	Lahaina	61·67	19·20	17·50	91·92	Poor
Java	Warren 36	55·56	18·80	14·90	79·30	Healthy, robust
Barbados	White Sport	66·67	17·90	15·10	84·40	,, short
Java	No. 66	58·34	19·60	18·60	92·80	Poor
,,	No. 137	70·00	20·70	19·20	92·07	Poor, owing to location
,,	No. 247	66·67	19·60	17·20	87·70	Healthy
,,	G.Z.P. 100	56·25	21·90	20·60	94·10	Fair, slightly sprouted
,,	No. 239	58·80	14·60	10·10	69·20	Diseased
,,	No. 223 (red)	64·28	19·60	17·70	90·40	Poor
Cuba	Crystalline	66·67	19·50	17·00	87·20	Healthy
,,	Cinta	62·50	21·00	19·30	91·90	,,
Java	No. 51	63·52	19·10	17·30	90·60	Excellent
,,	Black Louzier 311	58·62	21·20	18·20	85·90	Poor, owing to location
,,	No. 223 yellow	60·00	18·70	16·40	87·70	Poor, borers

SUGAR INDUSTRY (Continued).

Seedling Canes in British Guiana.

The following interesting information in regard to the experimental cultivation of Seedling canes at Diamond Plantation is taken from a letter received from the Manager, Mr. John M. Fleming, dated March 24 last:—

For the short grinding just completed here last week, 605 acres of Bourbon and 104 acres of B. 208 were reaped. All of these canes suffered from a deficiency of rain in January to the middle of March, when they were young, and later on, from the middle of April to the middle of July, from excessive wet. This made them stunted, and in the arrowing season almost every individual Bourbon cane flowered: B. 208 arrowed more than in the previous year, but still not nearly to the same extent as Bourbon. It exhibits, however, a marked tendency to sprout at the eyes after the arrowing period.

The Bourbon cane yielded an average of 1·91 tons sugar per acre: the B. 208, 3 tons per acre, or about 57 per cent. more. This is a very much greater difference than I have hitherto observed, and is due to the stunted crop of Bourbon. It is an interesting record, but by no means expresses the comparative values of the two varieties in a year more suited to the Bourbon. The quality of cane juice from each was excellent, and far better than is usual in Demerara.

The following table gives the results of growing Bourbon and seedlings, for 1901, 1902, and 1903 on this plantation:—

	1901			1902			1903		
	Acres.	Tons.	Aver.	Acres.	Tons.	Aver.	Acres.	Tons.	Aver.
Bourbon	2,912·208	6,735	2·31	2,791·062	6,464	2·31	2,895·067	7,194	2·48
Seedlings	1,073·082	3,215	2·99	1,317·277	3,706	2·81	1,879·267	5,331	2·83
Total ...	3,985·290	9,950	2·49	4,109·039	10,170	2·47	4,775·034	12,525	2·62
Seedlings better by	29 per cent.			21 per cent.			14 per cent.		

The following is a further expression of opinion from Mr. Fleming in regard to cane B 208:—

B. 208 is in my opinion the best cane you have given us so far. I have just finished reaping nearly 100 acres of it, and notwithstanding the fact that after they were planted in January 1903, they encountered a severe drought and some months later an exceptionally heavy rainy season, and were in consequence not a heavy crop, they were still a long way better than Bourbons grown under similar conditions. An objectionable feature of this variety is a marked tendency to sprout at the eyes after the arrowing season, or when its growth has from any cause been temporarily checked. A very strong point in its favour is that in every trial I have made of it I have invariably found the juice of excellent quality.

West Indian Seedling Canes in Queensland.

Mr. Edward Grimley, Secretary of the Queensland Acclimatization Society, has forwarded to Mr. J. R. Bovell the following newspaper extract relating to seedling canes (B. 147, B. 156, B. 176) sent him some time ago. It will be seen that B. 147 gave particularly good results, 23·40 per cent. of 'possible obtainable cane sugar' (a local term signifying its marketable qualities) being recorded:—

At the last meeting of our council the following analyses of sugar-cane were read. The canes were grown by Mr. J. G. Robbins, Mayfield, Mowbray River, Port Douglas. They are some of the canes this society imported some years ago from the West Indies, and were at that time the best of the seedlings raised in Barbados and Demerara, and which we distributed to some forty or fifty plantations all along the eastern coasts. At first they did not seem to do well, and I am now waiting for particulars of analyses from various sources. If they are found to do as well at other places as with Mr. Robbins, a great stride has been made in the fight between cane and beet. All these canes have been found in the West Indies to give a good tonnage to the acre, ranging mostly about 30 tons.

ANALYSIS OF SEEDLINGS (JUICE).

Description of cane. *	Total solids.	Specific gravity.	Degrees Beaumé.	Cane sugar.	Fruit sugar.	Organic matter.	Purity.	Possible obtainable crystalizable sugar.
D. 145 (R)	16·8	1·0691	9·3	13·50	1·80	1·50	80·4	11·85
D. 115 (P)	16·6	1·0682	9·2	14·10	1·44	1·06	84·0	12·85
D. 116 (R)	18·7	1·0779	10·4	16·30	·74	1·66	87·2	15·10
B. 147 (R)	19·8	1·0842	11·0	17·80	·38	1·62	89·9	16.80
B. 156 (P)	19 0	1·9788	10·5	16·90	·36	1·24	88·9	15·85
B. 147 (R)	25·5	1·1088	14·1	24·10	·20	1·20	84·5	23·40
D. 115 (P)	22·7	1·0954	12·6	20·10	·96	1·64	88·5	18·80
D. 116 (R)	23·20	1·0977	12·8	21·20	·20	9·77	91·4	20·20
D. 145 (R)	23·0	1·0968	12·7	21·10	·72	1·18	91·7	20·15
B. 176 (P)	24·4	1·1002	13·5	22·80	·38	1·22	93·4	22·00
B. 156 (P)	23·2	1·0977	12·8	21·70	·39	1·11	93·5	20·05

* Description of cane: (R) Ratoon. (P) Plant.

The first five were cut on July 14, and the balance on October 4.

JAMAICA TEA.

The Jamaica *Gleaner* quotes as follows from the *Financier*:—

The culture of tea seems destined to become an important industry in the island. The experimental stage was passed last year, when 5,030 lb. was the crop; this year 15,000 lb. were produced and it is confidently predicted by those engaged in the business that inside of five years an annual production of 250,000 lb. will be attained. Each year in December the plant is cut off about 8 inches above the ground, and, as it throws out its bud and leaf-bearing shoots, the buds are nipped off every two or three weeks through the year and the curling, fermenting and curing processes contribute to the making of the marketable product. That it meets the requisite standard of quality would seem to have been fully demonstrated, for the expansion of facilities on a large scale is in progress.

WEST INDIAN FRUIT.

BARBADOS BANANAS.

The following is an extract from a letter from the Secretary of the West Indian Club (W. A. M. Goode, Esq.), dated London, May 2, addressed to the Imperial Commissioner of Agriculture for the West Indies:—

I at once put your kind suggestion into execution and at the last Club dinner, held on April 27, we enjoyed the Barbados bananas and sweet potatos sent up by Messrs. Pink & Sons. Some twenty or thirty members were present and all expressed themselves as highly pleased with the quality of the product: the bananas were especially good. They were all labelled 'Barbados,' so that the island got full credit, and in addition I made a little speech in which I informed those present how the bananas came to be on the table. I have written Messrs. Pink saying that I shall be glad to help them in any way I can, and Mr. Rutherford, of Wilkinson & Gaviller, who presided at the dinner, has also written to them and sent a list of names of people to whom they might send samples and get business. Several merchants here that night expressed gratified surprise at the quality of the bananas, and I have no doubt from what I hear, that the Barbados trade in bananas will profit by your suggestion to the West Indian Club.

HANDLING AND PACKING FRUIT.

Mr. R. L. Young writes in the current number of the *Bulletin of the Jamaica Department of Agriculture* on the subject of handling and packing fruit as follows:—

Let me commence by stating that most of my experience in handling fruit of all kinds, more especially of citrus fruit, has been in cultivated groves; as I have never had any satisfactory results in handling our wild citrus fruit, owing to the inability to control the labourers, whilst scattered all over the pastures. In a cultivated grove the trees are followed row by row, one person with clipping sheers with round points, meant for that purpose, whilst a child follows with a padded basket to receive the fruit. Any fruits slipping from the hand or touching the ground ever so lightly are rejected. The fruits are not taken from the trees in one picking, the thoroughly ripe ones are selected first, a preference being given to those that are clean, bright coloured, well shaped, firm, and smooth, as most likely to command good prices; at the same time, by this method the trees are lightened, and assisted to bring on the later fruit. Another advantage of our cultivated over the wild fruits is that they can be stem cut right away from the trees, thereby avoiding the very common danger of tearing the skin, when the gatherers have to climb the trees to pull them.

The fruit should be picked at least three or four days and spread out in the packing house, before attempting to pack them, allowing the rind to shrink and lose its surplus moisture. If packed immediately after picking they will sweat in the boxes, even at an ordinary temperature, and the contents of the box become damp, and are in danger of rot and decay. Another advantage gained by allowing the fruits to shrink is that the skin becomes more pliable and yielding, and the fruits are better able to stand the pressure of packing, at the same time bringing to light any with imperfections, such as prickle marks, scratches, or bruises, which can be rejected forthwith.

The packing of oranges has now been reduced to a fine art, and the box usually used is the standard one of 26 x $11\frac{1}{2}$ x $11\frac{1}{2}$ inches, boxes being much preferred to barrels, owing to greater convenience in handling them.

The oranges are then wrapped and packed. The old system of bringing one orange directly on the top of the other has been discarded. They are now alternated, so that each orange comes over the space between two, giving the whole more solidity and elasticity, and the fruit, as a result, sustains less injury from rough handling.

The sizes of the oranges are regulated, a big and a small one never being put in the same box. For this purpose a sizer is used, which helps to simplify matters very much, boxes being arranged to hold 96, 112, 126, 150, 176, 200, 216, 250.

The fruits are then packed closely and firmly in the box, so that there will be no room for them to tumble about and be bruised. Next, a thin cover is placed on, and held in position by two thin cleats across the top ends, the centre of the top being left free.

The distinguishing brand is then placed on either end, and the number contained in the box is carefully printed on the side.

The Moon Flower. We should be glad to obtain information as to the occurrence in the West Indies, in the wild or cultivated state, of the Moon Flower, *Ipomoea Bona-Nox* (Calonyction speciosum). As the juice of this plant can be used for coagulating the latex of *Castilloa elastica*, it is desirable that the vine should be examined with a view to determining its constituents.

COTTON NOTES.

Recent Sales of Barbados Cotton.

The following particulars have been furnished by the Secretary of the British Cotton Growing Association in respect of the sales of Barbados cotton shipped from that island from February 6 to March 26 last:—

(1) 19 bales shipped per S.S. 'Darien' and advised in your letter of February 6. All this is sold; the 16 bales of Sea Island at 16*d.* to 16½*d.* and the 3 bales of Egyptian at 8¾*d.* A report on this lot was sent to you on April 14. The net proceeds were £242 4*s.* 3*d.*

(2) 14 bales shipped per S.S 'Wanderer' and advised in your letter of February 19. All this cotton is sold; 13 bales of Sea Island at 16½*d.* and the 1 bale of Egyptian (No. 27) at 8¾*d.* I enclose valuation of this shipment. The net proceeds of this consignment were £220 16*s.* 6*d.*

(3) 41 bales of cotton and 9 bags of seed shipped per S.S. 'La Plata' and advised in your letter of February 27. All this cotton is sold; the 36 bales of Sea Island at 15*d.* to 16½*d.* and the 5 bales of the Egyptian at 8¾*d.* The seed is unsold. A report on this consignment was forwarded to you on April 12. The net proceeds were £625 10*s.* 8*d.*

(4) 43 bales of cotton and 17 bags of seed shipped per S.S. 'Tagus' and advised in your letter of March 12. All this cotton is sold with the exception of No. 98; the 34 bales of Sea Island sold at 14*d.* to 16½*d.* and the 9 bales of Egyptian at 8¾*d.* A report on this shipment was forwarded to you on April 12. It realized net £669 5*s.* 4*d.*

(5) 40 bales and 2 bags of cotton and 20 bags of seed shipped per S.S. 'Atrato' and advised in your letter of March 26. All the cotton is sold; the Sea Island at 16*d.* to 16½*d.* and 3 bales of Egyptian at 8¾*d.* The 2 bags of native cotton have been sold at 8½*d.* Valuation and report on this shipment are enclosed herewith.

Barbados Cotton Industry.

The following report from the Cotton Committee of the Barbados Agricultural Society was handed in at the regular meeting of the Society held on May 28:—

The committee appointed at a meeting of the Society held on February 6, 1903, to co-operate with the Imperial Department of Agriculture for the West Indies in its endeavour to establish a cotton and onion industry in Barbados, begs to submit the following interim report on the cotton industry. Later on, when the cotton season is over, the cotton shipped and the proceeds divided, the Committee trusts to be in a position to present a fuller report, giving a short history of the movement from its inception, together with a detailed account of the working of the factory, the total cotton ginned, etc.

After extensive additions had been made to the factory towards the close of last and the beginning of this year, the Central Cotton Factory was re-opened by his Excellency the Governor on Monday, January 25 last.

Shortly before the completion of the factory, Mr. Seabrook the ginning expert who had been engaged by the Imperial Commissioner of Agriculture specially in connexion with the cotton factory at St. Vincent, arrived in Barbados on his way to that island, and Sir Daniel Morris was good enough to allow him to remain in this colony for a fortnight so as to render assistance in setting the gins and explaining generally how cotton factories should be equipped and run.

From the time the factory was started in January to the present time 225,224 lb. of seed-cotton have been ginned, yielding 64,909 lb. or 28·82 per cent. of lint, and 156,990 lb. of seed; the loss during ginning amounted to 3,325 lb. or nearly 1½ per cent. of the total weight of seed-cotton. Of the seed 55,105 lb have been crushed, and 12,284 lb. belonging principally to peasant proprietors, have been shipped.

The total expenses to date, including the money advanced to small proprietors, are £417 5*s.* The cost of crushing the seed at 6c. per 100 lb. is £6 17*s.* 9*d.*

Since the beginning of the present ginning season 241 bales and 5 bags of cotton have been delivered. Of the bales 230 have been shipped and 11 delivered to the owners or their agents, while the 5 bags have been shipped Of the bales shipped 200 were of Sea Island, 28 of Egyptian, one of Upland and one of mixed Sea Island and Upland cotton, and three of the bags were Sea Island and two of cotton obtained from native plants.

There is at present in the factory in small quantities belonging to different people sufficient cotton to make about 6 bales These small lots will be kept until the owners send in more seed-cotton, when they will be baled along with the new lots of lint. There are also at present 79 bags of seed-cotton in the factory waiting to be ginned as soon as sufficient is received to keep the factory going for two or three days.

Of the cotton shipped account sales have been received for 117 bales, realizing £1,760.

Details as to the result of these shipments will be found elsewhere on this page.

Upland Cotton.

The following article on the cultivation of Upland cotton in the West Indies is taken from the Barbados *Advocate*:—

A writer in the *Voice* of St. Lucia pleads for the cultivation of Upland instead of Sea Island cotton in St. Lucia. The latter, he says, requires to be treated as a hot-house plant, and although it may bring double the price of Upland, it is too expensive to cultivate. He argues that St. Lucia should continue to cultivate Upland and go on experimenting with Sea Island. The question is purely a commercial one. If the good folk of St. Lucia can establish a better paying industry by growing Upland cotton than by cultivating Sea Island, they would be silly not to do so. But they can hardly expect the Imperial Department of Agriculture to advise and assist them in growing the inferior though hardier plant, when the results of the Department's investigations all point to the inadvisability of such a course. At the present high market rate, there is a bare possibility that any other than the best lint might pay the cost of cultivation in the West Indies and leave a margin of profit. But the cotton industry of these colonies is not intended to meet a temporarily inflated market. Unless it can hold its own when prices get back to their normal level, the money and time spent on its establishment would be wasted. There is abundant evidence that in the near future the supply of cotton will have once more overtaken the demand, and in that case the prospects of Upland cotton becoming a remunerative West Indian industry are not likely to be specially roseate. It is because Sir Daniel Morris is working for the future as well as for the immediate present, that he counsels cotton growers to concentrate their energies on the cultivation of the Sea Island variety. That the experimenter will meet setbacks in the initial stages of the establishment of an industry is only what is to be expected; but such difficulties are seldom regarded as sufficient to justify the abandonment of the enterprise, unless it was entered on as a mere speculation without regard to the history of the plant or the suitability of soil and climate to its adaptation. The vast amount of literature on cotton issued periodically by the Agricultural Department shows how carefully that part of the question has been gone into, and how solid are the grounds on which the Commissioner bases his reasons for

advising that Sea Island be cultivated in preference to any other variety. If, then, the St. Lucia cultivators reject this advice and go in for Upland cotton, we believe they will still be afforded assistance by the Commissioner, but it must necessarily be discriminative. Otherwise, cultivators in other colonies, believing that the cultivation of Upland cotton was being carried on not merely with the sympathetic assistance but on the advice and with the active co-operation of the Department, might be misled into abandoning Sea Island and also take to growing the inferior staple.

Cotton at Jamaica.

The following is an extract from the official report of the meeting of the Board of Agriculture, Jamaica, held on Tuesday, February 16:—

A meeting of the Committee appointed to consider the applications for £5 grants for an experimental acre of cotton, consisting of Hon. W. Fawcett, Mr. H. H. Cousins and the Secretary, Mr. John Barclay, met at Hope Gardens on Wednesday, February 27, at 9.15 a.m.

The meeting considered thirty-four applications and after rejecting those which were from good banana districts, chose the following ten, as representing the most suitable districts in soils and climatic conditions:—

1. Miss Marvin,	Shortwood,	St. Andrew.
2. J. J. Robinson,	Stony Hill,	,,
3. Arthur J. Webb,	Llandovery,	St. Ann.
4. The Rev. C. T. Ricard	Pedro Plains,	St. Elizabeth.
5. A. C. L. Martin,	Alligator Pond,	Manchester.
6. The Rev. E. A. Arnett,	for lower Trelawny,	Trelawny.
7. C. R. Taylor, Secretary, St. John's Branch Society,	Guanaboa Vale,	St. Catherine.
8. Thos. H. N. Cripps,	Dallas Castle,	St. Andrew.
9. C. H. L. Nicholson,	May Pen,	Clarendon.
10. Rowland E. Gillespy,	Falmouth,	Trelawny.

The Secretary read a minute from Mr. Fursdon reporting that he had entered into arrangements with some Syrians, one of whom had long experience in all the branches of cotton cultivation in Egypt, whereby they could grow cotton as an experiment on 40 to 50 acres of land in the front of his house at 'Two Mile Wood,' Hartlands, on very reasonable terms, and he had given him an option to purchase a block of 480 acres of land within the next twelve months.

The Board expressed satisfaction that these Syrians had been so encouraged and agreed that everything should be done with a view to facilitate the experiment.

The Secretary submitted applications for the use of the steam gin at Spanish Town, from the Hon. T. H. Sharp, Mr. A. J. Webb, the Hon. H. T. Ronaldson, and Mr. Fursdon on behalf of the Syrians.

It was agreed to assign the sum of not more than £20 for free grants of cotton seed, and the Secretary was directed to insert the following advertisement under Government notices, viz.:—

The Board of Agriculture has decided to spend up to £20 from the grant made by the British Cotton Growing Association in the purchase of Sea Island cotton seed. The Board is prepared to consider applications for free grants of cotton seed on the condition that full reports are made to the Director of Public Gardens, to whom applications are to be made.

At the monthly meeting held on Tuesday, March 15, the following business connected with the cotton industry was transacted:—

The Director of Public Gardens said that he had ordered 2,640 lb. of cotton seed, and, taking into account the orders they had in hand, they would require 335 lb. more. It was decided to give free grants of cotton seed, sufficient to plant 1 acre, to approved applicants and the Director of Public Gardens was authorized to order 1,000 lb. more of Sea Island cotton seed.

Applications for the use of the cotton gin were made by the Hons. T. H. Sharp, and H. T. Ronaldson, Messrs. C. A. T. Fursdon, and P. H. Greg. The Chairman moved that the gin be placed with Mr. Fursdon at Hartlands, the Archbishop seconded, and this was agreed to, Mr. Fursdon to gin cotton from the experimental acres and any others offered to a reasonable extent at the standard rate of 1½*d.* per lb. The Chairman stated that he was writing to the British Cotton Growing Association asking for two hand gins which could gin 200 lb. a day.

Diseases and Parasites of the Cotton Plant.

Under this title there has appeared in the Demerara *Argosy* a series of four articles, written in a popular and interesting style, intended for the instruction of the cotton planters of British Guiana.

The writer mentions the publications of the U.S. Department of Agriculture and of the Imperial Department of Agriculture for the West Indies as the principal sources of his information. The remedies recommended to the cotton growers of British Guiana are the same as those that have been found most useful in the West India Islands.

Special stress is laid on the necessity for care and labour on the part of the planters, who are further enjoined to keep a sharp look out for pests and diseases of all kinds and to apply, on their first appearance, the remedies that are recommended. Planters are also warned to have on hand a supply of insecticides, so that they may not be taken by surprise in the event of an outbreak of insect or fungoid attack. It is pointed out in these articles that it is unnecessary for cotton growers to take alarm until some definite trouble arises, and then it is of vital importance to act quickly and intelligently. The importance of maintaining the cotton plants in as vigorous a state of growth as possible by manuring and careful cultivation is emphasized.

MALARIA AND MOSQUITOS.

At the recent International Congress on Hygiene and Demography held at Brussels, the following resolution regarding malaria was passed:—

That this Congress, recognizing the practical importance of the mosquito-malaria theory, would urge on all Governments in malarial countries:—

(1) that officials, both civil and military, be required before taking service in such countries, to show evidence of practical knowledge of the theory and its application;

(2) that educational establishments, whether Governmental, missionary, or other, in such countries be requested to include in their curricula, instruction of native students in the mosquito-malaria theory and its practical application;

(3) that officials ignorant of the theory or systematically ignoring its practical application be considered as unsuitable for service in malarial countries.

Paternoster Peas. A correspondent in Berlin is anxious to obtain a quantity of the 'large paternoster peas (black and red, as large as a cherry).' These are probably the seeds of *Ormosia dasycarpa.*

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 175 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, JUNE 4, 1904. No. 56.

NOTES AND COMMENTS.

Contents of Present Issue.

The present position of the cotton, banana, and onion industries at Barbados were discussed by the Imperial Commissioner of Agriculture at a recent meeting of Barbados planters (see editorial).

On pp. 179-80 information is given as to the cultivation of seedling sugar-canes in Cuba, Queensland, and British Guiana. B. 208 has given good results in Cuba and British Guiana, and B. 147 in Queensland.

In our next issue we hope to publish information in regard to the area devoted to varieties of sugar-cane other than Bourbon in British Guiana.

Our cotton notes on pp. 182-3 include the report of the Barbados Cotton Committee, the results of recent sales of Barbados cotton, and an account of efforts that are being made at Jamaica. We also publish a report by Mr. J. H. Hart, F.L.S., of Trinidad, on a visit to the Barbados and St. Vincent cotton factories. Mr. Hart gives a fairly detailed account of the equipment and working of these two factories.

At the request of the Chairman of the Board of Agriculture, British Guiana, we publish, on p. 186, a notice relating to the appointment of an Assistant Instructor in Agriculture at a salary of $600 per annum.

Extracts from the annual report of the Acting Superintendent of Dodds Reformatory, Barbados, and from a report by the Assistant Instructor in Agriculture in British Guiana on a visit to the Pomeroon and Moruca districts will be found on p. 189. The report on Dodds Reformatory contains interesting information in respect of the experiments with cotton and onions. These experiments met with very fair success.

Toronto Exhibition, 1904.

The following is an extract from a letter received from Messrs. Pickford and Black, of Halifax, relative to a West Indian exhibit at the Toronto Exhibition proposed to be held in 1904:—

> It is our opinion that, because of the very large Fair at St. Louis, it would not be advisable to have a West Indian exhibit at Toronto this year, but to take it up again the following year. Whilst the Toronto Show will, no doubt, be largely attended, still the more extensive exhibition at St. Louis will draw very large numbers, and it would appear to us that an occasional omission of an exhibit, such as the West Indies make, is preferable to running it every year.

Seedling Canes in British Guiana.

We publish on p. 180 interesting and encouraging information with regard to the success that has attended the growth of seedling canes in British Guiana. It is worthy of note that at Diamond plantation excellent results have been obtained with B. 208, of which seedling, it will be seen, Mr. Fleming holds a high but discriminating opinion.

Mr. Fleming demonstrates, in tabular form, the comparative results of seedling canes and the Bourbon variety during the last three years.

Lectures on Cotton Cultivation.

As already briefly announced in the *Agricultural News* (Vol. III, p. 72), it is proposed during the next few months to have a series of popular lectures on cotton cultivation throughout the West Indies.

For this purpose lantern slides have already been prepared, which will serve to illustrate the cultivation of cotton in its various stages.

It is hoped that, by means of these addresses, the sympathy and co-operation of all classes of the community will be enlisted, and that the experiments in cotton growing to be carried on during the coming season under the auspices of the Imperial Department of Agriculture will thereby be rendered of the greatest value to all concerned.

St. Vincent Cotton Factory.

In an address given by the Imperial Commissioner of Agriculture at a conference of cotton planters of St. Vincent, held in the Council Chamber, Kingstown, on Friday, May 14, it was announced that the gross amount of seed-cotton delivered at the factory to that date was 91,420 lb. Of this quantity, 82,524 lb. had already been ginned, producing 23,684 lb. of lint and 59,025 lb. of seed. The proportion of lint to seed-cotton was at the rate of 29 per cent. This is a higher rate than usual for Sea Island and is probably due to the presence of a quantity of small-seeded cotton of the Marie Galante type.

The earnings of the factory for nine working days, at the rate of 3c. per 100 lb. of lint, were £148 0*s.* 6*d.*

The prospects of cotton planting for the next season at St. Vincent are said to be promising.

Royal Mail Steam Packet Company.

The following extract is taken from the opening remarks in the report of the Court of Directors of the Royal Mail Steam Packet Company presented on May 11 last:—

In presenting the accounts for the year 1903, the Court of Directors have to report that the trade with the West Indies has continued in a depressed condition, and the rates of freight, both outwards and homewards, have, in many instances, been unremunerative. The action taken by the Colonial Office, in conjunction with the Imperial Department of Agriculture, for the development of the industries of the West Indies, which it is hoped will help to restore these colonies to their former prosperity, will continue to receive the warm co-operation of the Court, who in this connexion have had pleasure in carrying, free of freight, trial shipments of fruit, cotton, and machinery.

This Department deeply appreciates the generous and sympathetic efforts made by the Directors to assist in its work, and is glad of the opportunity of expressing the value of their hearty co-operation in promoting the agricultural development of the West Indies.

Cotton Cultivation in Montserrat.

A highly successful meeting of planters and small owners was held at the R. C. School at Montserrat on Saturday, May 14, when the Commissioner (his Honour F. H. Watkins) gave a 'Plain talk to Small Owners' on the cotton industry in Montserrat.

Mr. Watkins briefly summarized the advantages and disadvantages of cotton cultivation and urged his hearers, should they determine to embark on this new industry, to give their careful attention to various points in connexion with the growth of cotton and its cultivation for the market. After going into these points in detail, Mr. Watkins impressed upon the growers that they must realize: (1) that cotton requires suitable soil and climatic conditions, and constant and intelligent observation; (2) that this industry should not be embarked upon, unless the growers were determined to throw all their energy and power of observation into the cultivation; and (3) that if the industry is to succeed, unselfish and combined action must be taken to stamp out insect pests and disease.

Destruction of the Love Vine in Trinidad.

On page 342 of the last volume of the *Agricultural News* we gave a summary of a leaflet, issued in Trinidad, which described measures to be adopted for destroying the parasitic pest known as Love Vine (*Cuscuta* sp). So serious a menace to the agricultural interests of the island has this pest become, that steps have been taken to deal with it by legislation.

Under the Agricultural Protection Ordinance (No. 20 of 1902) inspectors have been appointed who will collect from infested spots and forward for identification to the Chief Inspector (Mr. J. H. Hart, F.L.S.,) portions of the pest. The Chief Inspector will thereupon obtain the approval of the Governor to sign an order to destroy the parasite. This order directs the destruction within twenty-one days, by burning or burying, 'of all that destructive vegetable growth known as *Cuscuta* or Love Vine now being and growing upon the said land'.

Provision is made under the Ordinance for the due carrying out of such order or for prosecution in the case of defaulters.

West Indian Bulletin.

The first number of Volume V of the *West Indian Bulletin* has just been published. This contains several articles likely to be of interest in these colonies. The first is a lengthy, but interesting article, by Mr. W. R. Buttenshaw, M.A., B.Sc., in which is brought together a mass of information relative to the starch-producing plants of the West Indies. The text is illustrated by eleven original drawings showing the characteristics of the starch grains in each case.

The second article is by Mr. R. Radclyffe Hall, B.A., and Mr. J. R. Bovell, F.L.S., F.C.S., giving the results of experiments in growing twenty-eight varieties of sweet potatos at Barbados under the direction of the Imperial Department of Agriculture.

Other articles are on the Fruit Industry of Jamaica, the Birds of St. Vincent and the Naudet process for extracting cane juice.

It may be added that the *West Indian Bulletin* is on sale by the London and Local Agents of the Department (price 6*d*., post free 8*d*.).

A New Pamphlet on Cotton Cultivation.

A pamphlet devoted to cotton cultivation is being prepared and will shortly be issued. This pamphlet, which is arranged in the form of a catechism of cotton growing, is designed especially for the use of peasant proprietors, small settlers and others who require information on this subject in a simple and popular style.

It will deal with the essential points in regard to cotton growing in all stages from the preparation of the soil to the preparation of the seed-cotton for the factory. Clear directions will be given as to the sowing of the seed, the proper season for planting, manuring, tillage, and care of the plant during its growth, including minute instructions as to methods of treating the cotton worm and other serious pests of cotton. In this pamphlet will also be given directions as to picking and sunning cotton so as to enable growers to obtain the best possible prices for their product. Finally, all the more essential points, to which attention will have to be paid, will be carefully summarized.

We strongly advise all cotton growers to obtain this pamphlet as soon as it is issued, and to make themselves thoroughly familiar with its contents: it is only by so doing can they hope to meet with that measure of success which is so heartily desired.

THE COTTON FACTORIES AT BARBADOS AND ST. VINCENT.

The following is a report, dated May 17, 1904, by Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens, Trinidad, on a visit recently made by him to the cotton factories at Barbados and St. Vincent:—

On the invitation of Sir Daniel Morris, K.C.M.G., and with the approval of his Excellency the Acting Governor, I proceeded to Barbados by the mail of May 6, for the purpose of witnessing the operations carried on in the cotton-ginning factory at Bridgetown, established by the Imperial Department of Agriculture.

Communicating immediately on my arrival with Sir Daniel Morris, I was able to make arrangements to see the gins at work on the morning of Monday, May 10. On arrival at the factory, I was met by Mr. J. R. Bovell, who was kind enough to show me the machines in operation and to explain their working in full detail.

As described in the *West Indian Bulletin*, Vol. IV, p. 317, the Barbados factory consists of six single-action roller Macarthy gins (Platts) and a hand-power baling press. My visit was timed to enable me to see the factory in full work and the first impression I received was the business-like character of all the operations. There appeared to be an abundance of raw cotton waiting to be ginned, and the machines were rapidly turning it into clean and marketable produce, in bales of 250 to 300 lb. each.

Mr. Bovell explained that, on the delivery of the cotton, each grower was given a receipt for the gross amount of seed-cotton delivered at the factory, and when the work of ginning was complete, the grower received a statement showing the net weight of lint and seed produced, after deducting for any loss which occurred in the operation. The cotton is at once baled and addressed ready for the market. It is sent on to the British Cotton Growing Association, which undertakes to dispose of the parcels to the best advantage of the producers.

The working of the power gins was thoroughly examined, and the most important features were clearly pointed out to me by Mr. Bovell. There appears to be little difficulty in obtaining operatives, and I am informed that they rapidly acquire the necessary skill. Each gin is attended by one man to feed and one woman to pick and dispose of the cotton as it leaves the machine.

The seed is crushed by a roller mill and is returned to the growers for cattle food; most of the present season's seed has been treated in this manner, as it is intended to use imported seed for the next crop.

As the full statistics of the Barbados factory will be published in due course, it is unnecessary to enter into details in this report. It may be mentioned, however, that the cotton appeared to be of excellent quality, and the manipulation all that could be desired. The soft and silky cotton coming from each machine at a regular speed, proved that they were working smoothly and well, and at a rate which caused the single baling press to be kept going at its best speed all the time.

Having to pay a visit of inspection to the Tobago Botanic Station, I returned by the Intercolonial Steamer, which enabled me to land at St. Vincent and inspect the factory in that island. Sir Daniel Morris being on board, I was able to accompany him on his visit to the factory, which is situated a short walk from the landing place. The inspection showed an admirably arranged three-story building with six gins at work and plenty of cotton to work upon. This mill, I was informed, is considered by Mr. Seabrook, the American ginning expert, to be fully equal in its arrangements to any in the United States.

The factory was in full work. The gins are of three different makes—two Platts, two Dobson & Barlow, and two Asa Lees. The gins, like those at Barbados, are some 40 inches in width, and their capacity has been estimated to be 300 lb. of lint per hour for six gins, or 50 lb. per hour for a single gin. The hand gins imported for use in Trinidad are roller gins of Platts make, and are about one-third the capacity of the power gin when driven at the same speed. They can be worked by power and are supplied with parts for that purpose. I was informed that hand gins can never be expected to do as good work as power machines, on account of the unpreventable variation in speed which occurs with hand labour. The Trinidad hand gins have, however, performed all the work they were called upon to perform during the present season, and their work appears to compare favourably with that done in other colonies. If, however, a large area is planted in Trinidad during the coming season, they will not be sufficiently powerful to deal with the crop, and further provision would have to be made to meet the wants of growers.

On enquiry I find that in none of the islands are advances made for growing cotton, but that full provision is made for ginning and marketing all that can be produced: it is considered a better policy to assist the industry by such means than to make direct advances to the growers.

I have, in conclusion, to record my appreciation of the kindness of Sir Daniel Morris in inviting me to inspect the working of the cotton factories under his Department, and for the personal trouble he took to ensure that I should make myself fully acquainted with essential details of the machinery and the methods of work which have been so successfully adopted.

BRITISH GUIANA.

Assistant Instructor in Agriculture.

Applications are invited from candidates for the above post, who should be between twenty and thirty years of age. Preference will be given to candidates having knowledge of and experience in the growth of tropical products under the conditions existent on the coast-lands of British Guiana. A knowledge of draining operations is of importance.

Candidates must submit with their applications copies of satisfactory certificates of good health and of good character together with copies of not more than three testimonials from their present or former employers.

The salary attached to the post is $600 per annum.

Duties. To give instruction in practical horti-agriculture to farmers and settlers in the various districts of the colony, to assist in the inspection and examination of the scholars of primary schools in the elements of agriculture, to assist generally in the supervision of experiments carried on under the auspices of the Board of Agriculture, to assist in the work of the nurseries at the Botanic Gardens and to take part in the general work of the Board.

The instructor will be expected to avail himself of the many opportunities which will be afforded him of increasing his knowledge of tropical agriculture, and will be required to undergo a course of instruction in agricultural science at the Government Laboratory.

Applications should be addressed to the Deputy Chairman, Board of Agriculture, Georgetown, British Guiana, on or before August 31, 1904.

EDUCATIONAL.

St. Vincent Agricultural School.

Several pupils of the Agricultural School, St. Vincent, will complete their courses, and be leaving in June and September. They will be nineteen years of age and have been in the school for four years. They have received a thorough training in all the operations connected with the cultivation and care of plants, and in the theoretical part of the subject. The Agricultural Superintendent of St. Vincent will be glad to hear from anyone desiring further information as to the character and capabilities of these boys.

Agricultural Scholarships at Jamaica.

The *Leader* of May 13 states:—

The Board of Agriculture has decided to offer three scholarships of the value of £35 each, tenable at the Government Laboratory, Hope, next year. The examination will be held on January 15 next, and it is to be hoped that a large number of competitors will come forward in connexion with this excellent move.

Tools for School Gardens.

A number of tools suitable for school gardens have been specially imported into Barbados by Messrs. C. F. Harrison & Co., at the request of the Imperial Commissioner of Agriculture, and are now on sale at reduced prices as follows:—

Forks at 3*s.* 6*d.* each; trowels (7 inches) at 1*s.* 3*d.*; weeding forks at 1*s.*; spades at 3*s.* 6*d.*; rakes with from six to twenty teeth, from 6*d.* to 1*s.* 8*d.*; and hoes at 1*s.*

Laying out School Gardens.

A circular has recently been issued in Grenada in which the Acting Agricultural Instructor makes useful suggestions for the laying out and general working of school gardens. We take the following extracts:—

The garden may be laid out in the following manner:—

(*a*) A narrow bed against the fence all round the inside of the garden: in this might be planted a hedge, for which purpose hibiscus, crotons, etc., are to be recommended. Ornamental climbers might also be trained on the fence.

(*b*) A number of small beds to be utilized for competition among the pupils in growing garden vegetables, etc.

(*c*) Large square beds for specimen plants of all sorts, to be used for purposes of instruction.

ARBOR DAY AT JAMAICA.

The Director of Public Gardens, Jamaica, has issued a notice that allotments of seedlings of the following trees in bamboo pots would be made to any church, school, or private individual, prepared to plant them out on Victoria or Empire Day (May 24):—

Bread-nut, *Cananga odorata*, the Carapa tree of Guiana (*Carapa guianensis*), *Cassia Fistula*, *Cassia siamea*, *Dillenia indica*, *Dolichandrone*, *Eucalyptus*, the Silky Oak of Australia (*Grevillea robusta*), Java Almond, Juniper cedar, Kola-nut, Lignum vitae, Mahoe, Mahogany, *Moringa*, Palms, Sandbox, *Spathodea*, Wild Tamarind, etc.

DEPARTMENT NEWS.

As already announced, the Imperial Commissioner of Agriculture for the West Indies embarks to-day in R.M.S. 'Atrato' for the United Kingdom.

The Hon. Francis Watts, B.Sc., F.I.C., F.C.S., Government Analytical and Agricultural Chemist and Superintendent of Agriculture for the Leeward Islands, arrived at Barbados in the S.S. 'Orinoco' on Saturday, May 28, to confer with the Imperial Commissioner of Agriculture on matters relating to the work of the Department in the Leeward Islands. Mr. Watts returned by S.S. 'Ocamo' on Tuesday, May 31.

Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, will leave Barbados on Monday, June 13, on an official visit to the Northern Islands. Mr. Buttenshaw will visit St. Lucia, Dominica, Montserrat, Antigua and St. Kitt's, and is expected to return to Barbados by S.S. 'Dahome' on June 24.

AVOCADO PEAR.

In the last issue of the *Agricultural News* (p. 167) we gave an extract from *Farmers' Bulletin* No. 169 containing information as to the composition of the red sorrel and the Surinam cherry. From the same source we take the following account of the avocado pear:—

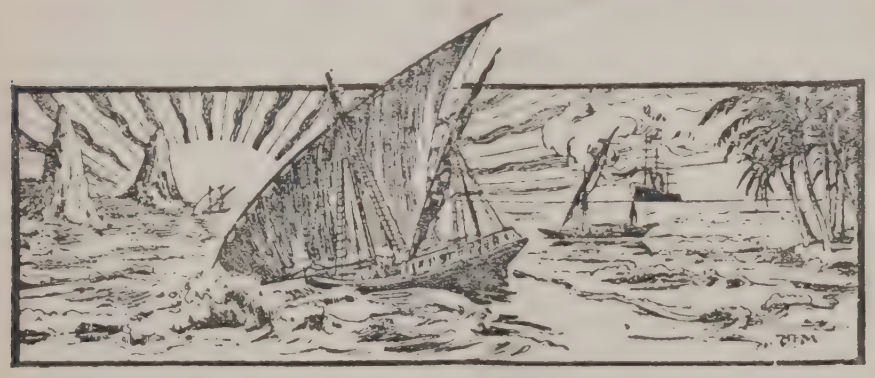
The alligator pear, also known as aguacate, avocado, midshipman's butter, etc., is the fruit of *Persea gratissima*, a tree native to tropical America, but now widely grown throughout tropical countries. The principal commercial supply in the markets of the United States comes from Jamaica, though there is a considerable and increasing production of this fruit in southern Florida, both on the mainland and on the keys. Small quantities are also grown in the wilder regions of southern California. The West Indian type, which is the only one found in the markets of eastern United States, yields a fruit of about the size of the largest pears. The varieties differ considerably in form, and range from deep purple to light green in colour. Generally speaking, they are not unlike a medium-sized egg-plant fruit in form and appearance. The portion eaten is a pulp which surrounds a single large seed. In texture the pulp is soft and somewhat like butter, and is perhaps most commonly used for salad making.

The Mexican type of alligator pear, which is now being tested in California and Florida, is a smaller tree and yields a much smaller fruit. It is, however, reported to endure several degrees of frost, whereas the West Indian type is injured by a temperature of 32° F.

According to Woods and Merril, who recently studied their chemical composition at the Maine Station, the average weight of the avocados analysed was about $\frac{3}{4}$ lb. each. The edible portion or pulp constituted, on an average, 71 per cent., the seed 20 per cent., and the skin 9 per cent. of the entire fruit.

The chemical composition was as follows:—

Water	81·0	per cent.
Protein	1·0	,, ,,
Fat	10·2	,, ,,
Carbohydrates	6·8	,, ,,
Ash	0·9	,, ,,



GLEANINGS.

The Hon. C. Arthur Shand writes from Nevis: 'The first shipment of cotton has turned out remarkably well and the prices realized vary from 1*s.* 3*d.* to 1*s.* 4*d.* per ℔.'

Agricultural Day Scholarships at the Antigua Grammar School of the value of £10 each a year have been awarded to Hugh Henry and Norman L. Yearwood.

Mr. T. J. Harris, Agricultural Instructor and Assistant Superintendent at Hope Gardens, Jamaica, has been selected for the post of Superintendent of Public Gardens in Bermuda.

The value of cotton and cotton seed exported from Egypt in 1903 amounted to £17,178,200, which represents about 89 per cent. of the total exports. (*Board of Trade Journal.*)

In Sicily small or damaged lemons are utilized for the manufacture of essence from the peel and concentrated juice from the pulp. After the juice is expressed, the residue is fed to goats.

The plot of land at the Mico Training College, Jamaica, that was dug by the teachers attending the agricultural course of training held in January last, is to be utilized by the students of that institution for cotton cultivation.

Unquestionably the most important industry in the Bahamas is that of the sponge fishery. During last year 1,292,037 ℔. of sponges, valued at £94,821, were exported, over 50 per cent. going to the United States. (*Board of Trade Journal.*)

As showing the method of arranging the price to be paid for canes at central factories, we quote the following from the St. Croix *Avis*:—'The factory sugar price was fixed on Monday at $1·48 per 100 ℔. of sugar, which, at 5½ ℔. per 100, is equal to 8·14c. per 100 ℔. of canes.'

At the last meeting of the Nevis Agricultural Society it was decided to hold an agricultural show under the auspices of the Society at the end of the present year or the beginning of the next. It was also decided to celebrate Arbor Day on the King's birthday.

The importation of kapok again shows a marked increase, the total for the Netherlands amounting to 51,918 bales in 1903, as against 45,551 in the previous year. The prices range at present thus: extra cleaned East India, 5¼*d.* to 5½*d.* per ℔.; first quality East India, 5*d.* to 5¼*d.*; uncleaned East India, 1⅔*d.* to 1⅘*d.* (*Consular Report on trade of Amsterdam.*)

According to the report on British Guiana for the year 1903, the balata industry was particularly successful, the amount of the gum obtained for the year being 540,800 ℔., or 50,357 ℔. in excess of the highest return ever reached in any one year.

Official statistics show that the orange and lemon harvest of Italy for the year 1903-4 was a most abundant one, about 5,250,000,000 fruits having been gathered, compared with 4,900,000,000 in 1902-3. (*Chamber of Commerce Journal*, May 1904.)

The Jamaica *Leader* of May 13 contains an interesting little article on the ground dove. It is stated that before the introduction of the mungoose this bird used to make its nest on the ground: now it builds principally upon low shrubs. This adaptation to new conditions has probably saved the ground dove from extinction.

According to the *Pharmaceutical Journal* of April 30, a paper has recently been published in which it is shown that the seeds of *Strophanthus gratus* are probably the best source of the drug strophanthin. The official seeds are those of *S. hispidus* ('Kombe'); but, it is pointed out, these are not easily obtained pure in commerce. *S. gratus* occurs commonly in the English, French and German territories of tropical Africa.

Prof. E. Dwight Sanderson, State Entomologist for Texas, writes in the *Entomological News*: 'The work of the Division of Entomology of the United States Department of Agriculture and of the State Entomologist has resulted in demonstrating practicable methods of fighting the cotton boll weevil and the boll worm, and it is now largely a question of getting the cotton planters to adopt the improved methods of culture outlined.'

According to the *Consular Report on the trade of Iquitos* (Brazil) for 1903, the total exports of rubber from Iquitos including Caballo Cocha and Leticia were 803,953 ℔. Owing to the great rise in price of rubber, the difference in value is far greater, showing an increase on last year of £238,000, the total value being £650,000 as compared with £412,000 last year. Over 60 per cent. of the export were shipped to Liverpool, the remainder going to Havre.

During the last ten years the importation into Baltimore from Jamaica of oranges, limes, bananas and other fruits has reached large proportions. During a single week of the past year nine steamers arrived bringing the enormous number of 199,010 bunches of bananas, besides other fruits. Owing to the hurricane in Jamaica of last August, however, the trade is at present [March 7, 1904] almost completely stopped, and it will be some months before it is resumed. (*Consular Report on trade of Maryland, etc.*)

We extract the following from the annual report of the Headmaster of the Lodge School, Barbados: 'The new science class room and physical apparatus have, I feel confident, proved of great benefit to the school in providing more scope both for teaching and for learning. And the substitution in the junior school of classes in elementary physics for the former weekly lectures on chemistry (a change which I have introduced in higher forms this year) is already showing good results in developing habits of observation and some degree of manual cleverness.'

BRITISH GUIANA: REPORT ON A VISIT TO THE POMEROON AND MORUCA DISTRICTS: By E. Beckett, Assistant Instructor in Agriculture.

This is a report to the Board of Agriculture on a visit made to the abovenamed districts in January last.

Mr. Beckett remarks that the most interesting feature of the vegetation of the Tapacooma Creek is the large number of Hevea rubber trees. Efforts made to obtain rubber from them did not, however, meet with success; possibly better results would be obtained at a different season.

As Mr. Beckett states, it is difficult to tell whether the species are of any economic value, but it is probable that some of them are. We would suggest that a careful and systematic investigation of these rubber trees might be of considerable advantage to the colony at the present time. In any case, it is not unlikely that the true Para rubber tree (*Hevea brasiliensis*) would thrive equally well in the same situations and prove of value.

At the Waramuri Mission Station a number of economic trees of various kinds were found, but there was little or no systematic cultivation. Mr. Beckett advised the growing of pine-apples and ground nuts.

On the Aciwini there was a carefully cultivated cacao plantation, which the owner was recommended to extend. In this district cocoa-nuts have been planted pretty extensively. It is estimated that within the last two years 70,000 trees have been planted. One planter has an excellent hand-mill, capable of grinding 1,000 nuts per day.

Coffee, cacao, cocoa-nuts and tobacco appear to be promising crops for this district. Insufficiency of labour is at present the chief drawback: it is considered that a better knowledge of even elementary principles of agriculture is much needed by the farmers.

The following extracts from this report are of interest:—

Maccaseema.—This is Mr. im Thurn's old home and was once the most beautiful station in the colony, owing to the great care and attention that distinguished gentleman gave to the many interesting and valuable plants which he grew there. The orchids and palms and a large and beautiful *Parkia* are still worth seeing. Mr. Gall keeps the place clean He has made a fair cricket pitch and has succeeded in teaching his Indians to play cricket.

* * * *

The one coloured man, who is doing things on a larger scale, is Mr. Bedford Garraway, who owns 400 acres, of which over 150 are cultivated. He hires a fair number of negroes, East Indians and Aborigines. He has several thousand coffee trees and numbers of cacao, but all are sadly in need of pruning. Also several hundred cocoa-nut palms and an efficient mill for dealing with the nuts. Many acres are devoted to quick-growing crops, such as corn, cassava and plantains, which are all grown extensively on business lines. It was noticeable that crops giving quick returns were weeded, drained and kept in excellent condition, whilst the cacao and coffee were comparatively neglected.

His soil is a very good clayey loam, on which nutmegs, black pepper, grafted mangos and other valuable economic plants would do excellently. He keeps cattle, pigs and other stock, all of which appear to be well housed.

DODDS REFORMATORY, BARBADOS.

The annual report for 1903 of the Acting Superintendent of the Reformatory and Industrial School at Dodds was published in the Barbados *Official Gazette* of May 19.

Under the head of 'Cultivation,' the following report is given of the cotton and onion crops at Dodds, which appear to be distinctly promising:—

During the middle of the year 2¼ acres were devoted to the growing of the cotton plant, and later on 3½ acres more were planted, as a trial. The yield from the 2¼ acres was about 1,500 lb. of seed-cotton as a first return. This quantity is considerably lower than what is obtained in cotton-growing countries, but there is little doubt that, by the use of proper seed and careful cultivation, a better yield can be obtained. This field of cotton suffered very slightly from the attacks of the worm, but during the drought of November many of the pods were attacked by a fungoid disease, which decreased the yield and caused much inconvenience in picking and cleaning. These cotton trees are commencing to bear a second time. The results of the first shipment of the cotton have not yet been received, but with the present price obtainable for the lint the outlook is encouraging.

About 10 acres will be planted in cotton next season, and fresh seed of the best quality, obtained from the Sea Islands, through the Imperial Department of Agriculture, will be used.

The attempt at growing onions, which was mentioned in the last report, was tried on a somewhat larger scale this year. On the whole, it is a successful one. The onions seem to thrive and grow readily after the rather tedious work of transplanting from seed boxes and beds has been done. The season, however, was not very favourable towards the end of the year, November being very dry, while the latter part of December, when some of the onions were ripening, was continually wet, and this caused many of them to spoil. The remainder of the crop, which is only partially reaped, appears to be healthy and promises well.

The red onion is the hardier variety, but, on the whole, the white onion, though more delicate at the start, seems to give a better and more marketable product. Fresh seed is being obtained through the Imperial Department of Agriculture for the West Indies, and another crop will be grown next season.

FOREST RESERVES.

In Hawaii much attention is being devoted to forest protection. We print the following extract from the *Hawaiian Planters' Monthly*, referring to the co-operation of the planters with the government, in the hope that their example will be followed in the West Indies:—

The Hawaiian Planters' Association is in sympathy with, and is disposed to lend its aid and assistance to, the Government and to the Commissioners of Agriculture and Forestry in agricultural and forestry matters. Were it not for the assistance given by the Planters' Association and its members, it would be not only impracticable, but impossible, to carry out the plans of the Government in the lines of forest preservation and development. A great many of the volunteer foresters appointed by the Government are sugar plantation men and managers, and their hearty co-operation is essential to the successful carrying out of the Government's plans.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London Drug and Spice Market for the month of April:—

Though the Budget resolutions have not directly affected the articles of trade with which we are more especially concerned in these notes, commerce in general, as is usual on these occasions, has indirectly been more or less disturbed.

The drug and spice markets during the month have shown but little activity, and even in camphor and menthol and other Japanese products the same tone has prevailed. Besides this, the fact of there being no spice or drug sales during Easter week has had the effect of diminishing the bulk of products which ordinarily change hands during the period of our monthly review. Incidentally we may mention that colonial products continue to occupy a considerable amount of attention in the public press, especially with regard to cotton: the possibilities of the West Indies and West Africa being able to supply, in the near future, a large portion of 'Empire-grown cotton' is viewed with confidence and satisfaction.

The following are the principal articles coming under the head of drugs and spices that have occupied attention in the market during April:—

GINGER.

At the spice auction on the 13th., Jamaica ginger sold at the following rates:—Fair to good washed, 42*s.* to 50*s.*; medium dull to middling washed, 35*s.* 6*d.* to 41*s.*, and common to ordinary, 32*s.* to 34*s.* 6*d.* About 315 barrels were disposed of. Cochin was in very little demand, and Japanese limed sold without reserve at 22*s.* A week later, prices had advanced from 1*s.* to 2*s.* on the better qualities, and declined 1*s.* on the ordinary kinds, the quotations being, 50*s.* to 53*s.* for bold Jamaica; fair to good washed, 43*s.* to 48*s.* 6*d.*; ordinary dullish to medium, 36*s.* to 42*s.* 6*d.*; and common to ordinary, 31*s.* to 35*s.* As many as 450 packages were disposed of. Medium and bold cut were bought in at 50*s.*, and unsorted native cut at 40*s.* At this sale, 650 packages of Cochin were offered, all of which were bought in. At the last sale on the 27th., 210 barrels of Jamaica sold at an advance of 1*s.* for good qualities, while full prices were secured for common. There was a slow demand for Cochin, good bright washed fetching 26*s.*

SARSAPARILLA.

The markets in this article have been steady throughout the month. At the first drug auction, fair genuine grey Jamaica was disposed of at from 1*s.* to 1*s.* 1*d.*, and coarse was held at 10*d.* per ℔. Native red Jamaica was offered in quantity and partly sold at 8½*d.* to 10*d.* for fair to good red, and 6*d.* to 7*d.* for common and partly sea-damaged; common Guatemala was quoted at 5*d.*, at which price it was bought in. At the last sale of the month, the following were the quotations:—28 bales of fair grey Jamaica were sold at 1*s.* per ℔., and part coarse at 10*d.* to 11*d.*; dull mixed red native fetched 9½*d.*, and sea-damaged 6*d.* At this sale 8 serons of fair Honduras were disposed of at 1*s.* per ℔.

ARROWROOT.

At the spice auction on the 13th., 350 barrels of St. Vincent sold at 1¾*d.* for good manufacturing, and 2⅜*d.* for fine; a week later the prices had slightly declined, while at the last sale on the 27th., of 576 packages of St. Vincent offered, 68 were sold of good bright quality in tins at 3¾*d.*, and good manufacturing in barrels at 1¾*d.*

LIME JUICE, ANNATTO SEED, PIMENTO, ETC.

Of other products, 17 casks of raw West Indian lime juice were offered and sold in the middle of the month at 1*s.* 2*d.* per gallon; a week later the price had slightly increased, being quoted at from 1*s.* 2*d.* to 1*s.* 3*d.* in puncheon lots; 4*d.* extra being asked for refined.

At the same period, annatto seed of good dark red quality from Madras and Aden were sold at 3¼*d.*, and fair red at 2½*d.*; of the 64 packages offered, 37 were disposed of. At the last sale in the month 33 packages were offered and 28 sold, dull Madras realizing 3½*d.*, while 8 bags of fair bright Jamaica fetched 3*d.* per ℔.

Pimento has maintained a quiet position during the month, ordinary selling at 3½*d.*, and fair at 3⅝*d.*

At the sale on the 14th., over 400 barrels of Barbados and Antigua tamarinds were offered, for which, however, there was but a poor demand, 10 barrels only meeting with customers at 12*s.* 6*d.* per cwt. in bond: an inferior quality was offered at from 10*s.* to 11*s.*

Cassia Fistula was offered on the 29th., 5 packages of fair West Indian being sold at 29*s.* per cwt., and 15 other packages of poorer quality were bought in.

At the same auction 6 bags of kola nuts were sold, without reserve, at 4½*d.* per ℔. They were described as 'small dull dried, of African character.' A package of fair sound West Indian was also disposed of at 6*d.* per ℔.

RUBBER IN SAMOA.

The *Consular Report on Samoa* for 1903 contains the following information regarding the growth of rubber plants in that country:—

Little attention has been given to the culture of rubber in Samoa up to the present time. A patch consisting of a few hundred trees of *Manihot Glaziovii* on the island of Savaii has grown very well, but has not yielded any satisfactory return either in quality or quantity.

Some 400 or 500 trees of *Hevea brasiliensis*, grown on Upolu at an elevation of 1,200 feet (now four years old), although in a fine healthy condition, have not reached the diameter nor the height to compare with reports from other countries. *Castilloa elastica* undoubtedly gives more favourable prospects; at four years old this variety shows almost twice the diameter of the *Hevea*, and an experimental tapping yielded a rubber of fine quality comparing favourably with that obtained from the *Hevea brasiliensis*.

Seeds from several varieties of rubber-producing creepers have been tried. Unfortunately the percentage germinating in most cases has not exceeded 5 per cent.: one package of seeds of the *Ficus elastica*, containing 5,000, did not give a single plant.

Possibly better results may be looked for on the eastern and southern slopes, and a few other localities on Upolu, where there is a greater rainfall and the distribution of rain is more equal during the year.

Sweet Cup. Mr. A. J. Jordan, Curator of the Botanic Station at Montserrat, writes: 'With reference to the query in the *Agricultural News* (Vol. III, p. 146) as to the progress made by plants of *Passiflora edulis* at the Botanic Stations in the West Indies, it may be of interest to your readers to know that two plants of this species are now flowering and fruiting at the out-station at Montserrat, where the plants have made good growth.

MARKET REPORTS.

London,—May 10, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' May 6, 1904; and 'The Public Ledger,' May 7, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 15/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—Demerara Sheet, 2/3; Venezuelan Block, 1/7 per lb.
Bees'-wax—£7 to £7 7*s.* 6*d.* per cwt.
Cacao—Trinidad, 58/- to 70/- per cwt.; Grenada, 52/- to 59/6 per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 60/- per cwt.; Demerara, 64/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 38/- to 39/- per cwt.
Copra—Trinidad, sundried, £15 15*s.* to £16 per ton, c.i.f.
Cotton—West Indian Sea Island, 11*d.* per lb.
Fruit—
Grape Fruit—10/- to 11/- per case.
Oranges—Jamaica, 8/- to 9/3 per case of 150 to 176.
Pine-apples—Antigua, 15/- to 16/6 per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 34/- to 60/- per cwt.
Honey—18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/10; Cake, thin, palish and pickings, 1/- to 1/1 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/1 to 1/5 per gallon; Concentrated, £12 15*s.* to £13 per cask of 108 gallons.
Lime Oil—1/5 to 1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/8 to 2/3 per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—120's, 7*d.*; 62's, 1/11 per lb.
Pimento—3⅜*d.* to 3⅝*d.* per lb.
Rum—Demerara, 7½*d.* to 9½*d.* per proof gallon; Jamaica, 1/9 to 8/- per proof gallon; Leewards, 7*d.* to 11*d.* per proof gallon.
Sarsaparilla—Jamaica, 9½*d.* to 1/- per lb.
Sugar—Crystallized, 15/3 to 16/- per cwt.; Muscovado, Barbados, 13/- to 14/3 per cwt.; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£12 to £12 1*s.* 3*d.* per ton.
Tamarinds—Antigua, 5/- to 8/6; Barbados, 10/- to 11/- per cwt.

Montreal,—May 13, 1904.—Mr. J. Russell Murray. (In bond quotations).

Cacao—Jamaica, 12c. to 13c.; Trinidad, 13c. to 13¾c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $22·00; Trinidad, $19·50; per M. c. & f.
Coffee—Jamaica, medium, 8¼c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¼c. to 7½c. per lb. c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 24c. to 25c.; Antigua, 22c. to 24c. per Imperial gallon.
Nutmegs—Grenada, 110's, 18c. to 19c. per lb. c. & f.
Pimento—Jamaica, 7c. to 7¼c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·15 per 100 lb. c & f.
—Centrifugals, 89°, $2·02 per 100 lb. c. & f.
—Molasses, 89°, $1·78½ per 100 lb. c. & f.

New York,—May 13, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¾c. to 13¼c.; Jamaica, 10⅞c. to 12c.; Grenada, 12½c. to 12¾c.; Trinidad, 12½c. to 14c. per lb.
Cocoa-nuts—Trinidads, $17 to $19; Jamaicas, $22 to $24 per M., selected.
Coffee—Jamaica, fair to good ordinary, Black River, 7c. to 7½c. per lb.
Ginger—Jamaica, 7½c. to 8¾c. per lb.
Goat Skins—Jamaicas, 55c. per lb.
Pimento—5½c. per lb.
Sugar—Centrifugals, 96°, 3 5/32c.; Muscovados, 89°, 3¼c.; Molasses sugars, 89°, 3 1/32c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 18, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—13c. per gallon (Imperial).
Sugar—$1·67½ per 100 lb.

Barbados,—May 21, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·25 to $3·60 per 100 lb.
Cacao—$11·00 to $12·00 per 100 lb.
Cocoa-nuts—$10·75 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $11·00 per 100 lb.
Hay—95c. to $1·05 per 100 lb.
Manures—Nitrate of soda, $60·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $75·00 to $76·00; Sulphate of potash, $67·00.
Molasses—12½c. per gallon (puncheon included).
Onions—Madeira, (bunched) $4·00 ex store; Bermuda, (loose) $1·30 to $2·26 per 100 lb.
Potatos, English—Nova Scotia, $2·40; Bermuda, $3·50 to $3·51 per barrel.
Rice—Ballam, $4·60 to $4·75 per bag (190 lb.); Patna, $3·50 to $3·60 per 100 lb.
Sugar—in hhds., 89°, $1·80 (packages included). Dark Crystals, 96°, $2·25 per 100 lb.

British Guiana,—May 19, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $8·00 per barrel.
Balata—35c. to 40c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 12c. per lb.
Dhal—New, $4·50 to $4·70 per bag of 168 lb., ex store.
Eddoes—$1·20 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—5c. per lb., ex store; Teneriffe, 10c. per lb.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per lb. (retail).
Plantains—25c. to 50c. per bunch.
Potatos, English—$4·00 per barrel.
Rice—Ballam, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·20 per barrel, $1·00 per bag.
Tannias—$1·44 per barrel.
Yams—White, $2·04 per bag.
Sugar—Dark Crystals, $2·10 to $2·15; Yellow, $2·30 to $2·40; White, $3·00 to $3·50; Molasses, $1·60 to $1·90 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—May 18, 1904.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to Good Red, $12·60 to $12·70; Estates, $12·75 to $13·00; Venezuelan, $12 65 to $12·85 per fanega (110 lb.).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—65c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·60 per 100 lb.
Onions—Teneriffe, $1·75 to $2·25 per 100 lb.
Potatos, English—$2·00 to $2·75 per 100 lb.
Rice—Yellow, $4·20 to $4·40; White Table, $5·00 to $5·75 per bag.
Sugar—White Crystals, $3·25; Yellow Crystals, $2·25; Molasses Sugar, $2·00 to $2·10 per 100 lb.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 57. BARBADOS, JUNE 18, 1904. PRICE 1*d*.

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Agricultural Education in Trinidad.

AS briefly mentioned in a recent issue of the *Agricultural News*, an interesting function took place in Trinidad on May 9, when his Excellency the Acting Governor presented to the Couva Government School the silver medal, which has been offered by the Agricultural Society for competition among the schools exhibiting at the School Agricultural Shows.

The exhibition of products raised by pupils attending elementary schools at the various Agricultural Shows that have recently been held throughout the West Indies, has received considerable support and encouragement from the Imperial Department of Agriculture. We are therefore pleased to notice that this matter has been taken up enthusiastically in Trinidad.

At the meeting referred to Mr. J. H. Collens, the Chief Inspector of Schools, briefly outlined the amended programme for the conduct of these shows, which the Government hoped to inaugurate. The exhibits at future shows were to be divided into four main sections. The first section was for vegetables, into which it was desired also to introduce specimens of grafted and budded fruit trees. The second was to be for vegetable products. He would like to see samples of starch, dry cacao and other products obtained from vegetables freely grown in the colony. Some inducement would also be offered for the exhibition of good specimens of rope and twine. The third section would be devoted to flowers, for they wanted to encourage their pupils to beautify their gardens. The fourth section was to contain specimens of needlework: this was to be the girls' section.

The Government did not desire, he would have them understand, to make agriculturists of all the boys of the colony, but their object was to make them useful members of the community. They desired to teach them to study nature, to learn nature's methods, and how to help nature, and to learn in what manner nature could best be made to help them. With that object they would encourage also the collecting of specimens of plants, etc. There were other efforts that might also be assisted such as bee keeping and lessons in carpentry.

The Government was doing its best to push on the teaching of agriculture in the elementary schools: in this connexion they were following what other countries, such as Great Britain, Germany, and the United States, were doing. No school in any of these countries was now considered to be well equipped unless a thorough and practical course in agriculture was provided.

In Trinidad their teaching was not confined to school shows; there was also the assistance given by the Agricultural Instructors. Further, with the lectures of Professor Carmody they were now able to impress something of the scientific part of the study of agriculture on the minds of the teachers.

His Excellency the Acting Governor, in addressing the meeting, referred to the prejudice that was alleged to be cherished by some persons against agriculture. He was sure the audience before him did not share a sentiment of so foolish a character. They had realized that agriculture was a profession demanding a great deal of intellectual energy, if it was to be made to bear its proper fruits. It required an intelligent man to make a good cultivator of the soil. It was a mistake to think that it was a mark of want of intelligence to leave the town and go into the country. In town all the markets of labour were becoming overcrowded. He was daily receiving applications from boys fresh from school who wanted employment, and he said that it would be better for them to devote themselves to agriculture and remember that the agricultural profession called for the highest characteristics of the human mind.

In conclusion his Excellency referred also to the fruit industry, and urged his hearers to do what they could to help this enterprise, which had been the saving of the neighbouring colony of Jamaica. Yet, when the soil and labour conditions in the two colonies were compared, it did not appear that Jamaica enjoyed any privileges greater than their own: it depended entirely on themselves whether they would make this new industry a success.

SUGAR INDUSTRY.

Seedling Canes in Cuba.

In our last issue we gave some of the results of the cultivation of seedling canes in Cuba. Mr. Atkins has kindly forwarded a number of these to the Imperial Commissioner of Agriculture, of which the following is a list:—

Cane.	Origin.	Cane.	Origin.
Meira	Queensland	G. Z. P. 100	Java
White Bamboo	,,	No. 223 (red)	,,
Louisiana Purple	Louisiana	No. 137	,,
Cinta	Cuba	Generalie	
Crystalina	,,	Zambourt 96	,,
No. 51	Java	Generalie	
No. 247	,,	Zambourt 100	,,

Varieties of Sugar-cane other than Bourbon in British Guiana.

The following is a return showing the area under cultivation in British Guiana with varieties of sugar-cane other than the Bourbon, published by the Board of Agriculture, British Guiana:—

The following is a summary compiled from the returns rendered to the Sugar-cane Experiments Committee, in answer to the circular letter of January 21, 1904.

With the exception of one plantation in the county of Demerara, returns have been furnished by every estate on which varieties of canes are being cultivated.

Varieties of canes other than Bourbon are being grown on areas of more than 1 acre on twenty-nine plantations in the county of Demerara, four in the county of Essequebo, and eight in the county of Berbice; or on forty-one plantations in British Guiana.

Many of the plantations which are growing varieties of canes on a relatively large scale have nurseries of several or of many varieties, the cultivation of which they intend gradually to extend.

The areas used for the experimental cultivation of the varieties other than Bourbon on the estates participating in the inquiry vary very greatly, from about 1 acre as the minimum to about 2,200 acres as the maximum.

One plantation in Demerara has an area of over 2,200 acres occupied by large-scale experiments with varieties of canes, while one in Berbice has about 1,600 acres similarly occupied.

The following shows the various acreages devoted to these experiments:—

	Demerara.	Essequebo.	Berbice.
2,200 acres	1	...	...
1,600 acres	...	...	1
Over 1,100	1	...	...
Between 800 and 1,000 acres	1	...	...
Between 600 and 800 acres	2	...	...
Between 500 and 600 acres	1	...	1
Between 300 and 400 acres	2	...	...
Between 200 and 300 acres	3	2	1
Between 100 and 200 acres	8	1	2
Between 50 and 100 acres	4	...	1
Under 50 acres	6	1	2

The returns show that in British Guiana 12,860 acres

are occupied with large-scale experiments in varieties of sugar-cane other than Bourbon, 9,150 acres being in Demerara, 2,791 in Berbice, 929 in Essequebo.

The total area of 12,860 acres, when compared with 9,518 acres in 1903-4 and with 6,282 acres in 1902-3, shows an increase upon them at the rates of 35·1 per cent. and 104·7 per cent., respectively.

The following shows the varieties other than Bourbon which are at present being cultivated in British Guiana on areas of more than 1 acre in extent on sugar plantations other than Plantation Diamond, no returns from which have been supplied by the Manager :—

Name or Number of Cane.	Number of Plantations.	Number of Acres.	Increased acreage on 1903.
D. 109 ...	31	3,338	1,266
White Transparent ...	30	2,876	107
B. 147 ...	22	1,138	362
D. 625 ...	23	537	354
D. 145 ...	27	458	142
D. 78 ...	19	373 (decrease)	88
D. 95 ...	10	341	25
D. 74 ...	11	223	40
Sealy ...	14	177	87
D. 117 ...	5	102	94
B. 208 ...	5	86	41
D. 115 ...	12	80	11
B. 109 ...	8	70	4
D. 116 ...	6	39	22
B. 41 ...	4	38	30
Green Transparent ...	3	31	11
Purple Transparent ...	1	29	4
Burke ...	1	28	0
B. 386 ...	1	23 (decrease)	18
D. 130 ...	4	15	6
D. 1,087 ...	2	13	3
D. 1,488 ...	2	13	13
D. 2,468 ...	4	13	6
D. 1,896 ...	1	9	9
D. 1,959 ..	1	9	0
Red Ribbon ...	1	6	0
D. 1,880 ...	1	6	3
D. 3,956 ...	2	5	5
B. 156 ...	2	3 (decrease)	7
D. 2,093 ...	1	3	0
D. 1,483 ...	2	2	0
D. 3,187 ...	1	2	2
D. 1,897 ...	1	1	1
D. 135 ...	1	1	1
D. 2,028 ...	1	1	1
D. 1,111 ...	1	1	1

The returns last supplied by Plantation Diamond—those for 1903-4—were as follows :—

Name or Number of Cane.	Number of Acres.	Name or Number of Cane.	Number of Acres.
D. 74 ...	42·063	1,897 ...	32
78 ...	385·177	4,191 ...	30·228
95 ...	68·120	4,415 ...	5·131
109 ...	511·107	B. 147 ...	13·060
115 ...	15·043	208 ...	106·017
116 ...	41·084	386 ...	10·270
117 ...	9	Cal. Queen ...	17·145
130 ...	29·020	Black Java ...	10
145 ...	328·131	Red Ribbon ...	18
625 ...	8	Sundry varieties	193·111

the total area being 1,875·177 acres, but as the Manager, in a recent letter to the Chairman of the Board stated that 2,200 acres were occupied by varieties of the canes other than Bourbon, it is evident that a considerable extension of area has taken place.

In the last issue of the *Agricultural News* (p. 180) we published detailed information in regard to the experimental cultivation of seedling canes at Diamond Plantation, kindly furnished by the manager, Mr. John M. Fleming.

TREATMENT OF WOUNDS IN CACAO PLANTATIONS.

The following is taken from the Trinidad *Bulletin of Miscellaneous Information* for April :—

In cacao plantations under the old system of cutlass pruning, snags or stumps have been left with jagged edges. Into these spots, spores of various wood-destroying fungi readily find their way, with the result that decay sets in rapidly, and wood ants take up a position therein, eating away the decayed wood, and leaving large holes in the stem to the depth of several inches. Water enters these holes and tends to decay the wood more quickly by its presence, and eventually the decay reaches the heart of the tree, which gradually dies out. It is certain that more trees are lost by bad pruning on a cacao estate than from any other cause. In pruning cacao, all branches should be removed close up to the stem and no snags, spurs, or projecting stumps should be left, but any branch removed should be cut close, the surface of the cut being made in a proper direction to shed water. It should then be pared with a sharp knife or other tool to make it smooth, and a little tar applied as a styptic or antiseptic dressing. If this is done, the edges of the wound will rapidly close over and completely shut out moisture, and all rotting will be stayed. In cases, however, where holes exist in the stem, they should be carefully cleaned out and filled up with Portland cement and sand, mixed in the proportion of one of cement to three of fine clean sand. This will effectually stop the hole and prevent the entrance of water, and will save the life of many a valuable tree.

The suggestion may be dismissed by some as being too expensive, but a little calculation of the cost and value of a tree, will, I think, prove to any reasonable mind, that it would be money well expended. At any rate, it is hoped that this note will persuade planters to try it a little at a time, as there can be no doubt of the ultimate result.

It is to be remembered that large cultivations, like cacao, are sure, sooner or later, to be attacked by disease, and in cacao plantations, as in cities, it is the cleanest and healthiest that escape, and not those where neglect of hygienic measures is but too apparent. So it will be with cacao; a clean and healthy tree is much less likely to be attacked than one in a half-starved and neglected condition. Tar all wounds, therefore, and prevent entrance of disease and the rotting of stems to the heart, and if neglect of pruning is apparent, by holes in the stem, have them filled as soon as possible with cement composition.

Algarrobilla Seed. This is an important item on the export list of certain districts of Chili. According to the *Consular Report* for the district of Coquimbo for 1901, 685 tons were exported, the Consul remarking that this was an incipient industry. In the following year, owing to a bad harvest, only 96 tons were exported. These seeds are obtained from *Prosopis pallida* (a synonym, according to the *Index Kewensis*, of *P. juliflora*, well known as the 'Cashaw' in the West Indies), and are used for tanning purposes.

WEST INDIAN FRUIT.

CRATES FOR BARBADOS BANANAS.

The following is an extract from a letter from Messrs. Pink & Sons to the Imperial Commissioner of Agriculture for the West Indies, dated May 2, 1904, dealing with the matter of suitable crates for Barbados bananas:—

The object of shippers is, I take it, to economize room on board ship. If the growers were to be a little more careful about the size of the crates, it would make all the difference. For instance, in the last cargo, No. 86 packed a bunch weighing 56 lb. in a crate, 2 feet 3 inches by 14 inches, which arrived in splendid condition. This was a most neat package, just large enough and not too large. Again No. 77 sent a bunch weighing 69 lb. in a crate, 3 feet by 1 foot 5 inches, which was about 6 inches too long and 3 inches too wide at the least. I regret to say most of the bananas are packed in these large crates, whereas smaller crates would cost less and take much less room, while the bananas themselves would arrive in an equally good condition.

If you would compare the crates sent from the West Indies with the crates sent from the Canary Islands, the difference in size is very marked. The West Indian crates not only require much more space on board the ship, but they take up much more store-room at this end. Another matter is the strength of the crate. One shipper packs his double bunches in pinewood crates, which will not stand the carriage of delivery to our store and then to our customers. It is true the fruit he sends is excellent; but his crates will not stand the weight. They require to be made of a tough wood that will not split. It is noticed that one shipper packs his fruit in crates that never break. The wood in this instance is light but strong.

CITRUS SEEDLINGS VERSUS GRAFTS.

A correspondent writing in the *Natal Agricultural Journal* of April 22 refers to the difficulties in getting suitable stocks for grafting citrus trees. Seedling lemons have a very short life while seedling oranges appear to do well; this grower is therefore trying sweet orange stock. He fully realizes the advantages of grafts over seedlings, the principle of which, in his opinion, is that the graft bears two or three years earlier than the seedling.

In reply to this correspondent, the Conservator of Forests remarks: '"Citrus" practically answers his own question. He claims that seedling lemons die off in his district in a few years, but implies that seedling oranges live into a fruiting condition. If so, then seedling sweet orange is the stock to use in his case. All the citrus kinds work more or less successfully upon one another; the difficulty is to find out which stock suits the soil and conditions of drought or irrigation.'

But it is also pointed out that the different citrus trees vary considerably in their requirements, which must be fully understood by the grower. 'The seedling which thrives as an unworked seedling at any place is the one to use there as a stock for others.'

In addition to the advantage mentioned above of early fruiting, there is a still greater advantage in that a fruit of known and marked quality can be perpetuated, for with seedlings the fruit is of an uncertain, and almost always poor quality.

ARBOR DAY.

Nevis.

The following is a brief summary of the report of the Sub-committee of the Nevis Agricultural and Commercial Society appointed for the purpose of making arrangements for celebrating Arbor Day in that island:—

That the King's birthday, November 9, be fixed for Arbor Day.

That the managers of schools be invited to associate in the undertaking

That the teachers be requested to endeavour to interest their children in the matter.

That a definite programme of the following nature be carried out:—At a fixed hour the scholars and teachers assemble at their respective schools and a short address be given by the manager or the teacher on the utility of planting and afterwards caring for useful and ornamental trees. The children will then be marched to the spot chosen for planting. On arriving at the spot the trees will be planted systematically, and the ceremony concluded with addresses and the singing of the National Anthem.

Stock eating the Bark of Trees. Mr. J. H. Crouch, Eugowra, writes in the *Agricultural Gazette of New South Wales*:—'I have noticed cattle at times, but more frequently horses, gnawing the bark off the trees for the last twenty-five years. I cannot say for a fact why they eat the bark, but am of opinion it is for want of salt, and when my stock take to bark-eating I give them salt, and notice they leave off almost at once.'

COTTON NOTES.

Supply of Paris Green in the Leeward Islands.

The following circular letter, recently issued by the Government Chemist and Superintendent of Agriculture for the Leeward Islands, is published for general information :—

Those about to plant cotton are advised to take precautions in good time to secure supplies of Paris green in order to destroy the caterpillars which attack cotton.

Paris green will not be distributed gratuitously from the Botanic Stations. Local merchants are being asked to import and keep in stock the necessary supplies; from them cotton planters can purchase at reasonable rates, and they are advised to make known their wants to them at an early date. Cotton planters are earnestly urged to provide themselves with supplies of Paris green before the caterpillars make their appearance; it is only in this way that attacks can be quickly met and economically controlled.

Cotton Ginning at Jamaica.

We extract the following from a report, in the *Gleaner* of May 30, on a visit to the cotton ginnery recently erected at Hartlands, Jamaica:—

The gin is run by an oil engine which is of English make. The working of the gin is very simple. The cotton falls in at an opening at the top, is caught, and a knife separates the seed from the cotton. The seeds are then allowed to fall to the floor. The cotton is caught and pressed between a roller which, technically, is called a porpoise roller, and comes from the roller bright, with the appearance of yellow silk. It is then taken and instantly put up into bags ready for exportation. The *Gleaner's* representative was informed that each bag is estimated to hold 100 lb. of cotton.

At present no use is made of the cotton seed, which can be used as food for cattle, and which is also the product from which the so-called 'sweet oil' so much used by the Jamaica peasantry, is manufactured. Hopes are, however, entertained, that machinery will be introduced for this latter purpose. The gin was made in England by Messrs. Platt Bros., Ltd., of Oldham. The average rate of ginning is 1½ lb. of cotton per minute.

The *Gleaner's* representative was taken over the cotton fields by Mr. Jocopo Dadd, a Syrian gentleman, who had much experience in cotton growing, and who is now engaged with Mr. Fursdon in the culture of this product. Mr. Dadd has at his disposal 50 acres, which he intends to plant out in cotton. The varieties planted, and which were shown to the *Gleaner's* representative, are the Sea Island and Egyptian, and most of the trees are over two months old.

Cotton Cultivation in the British Empire and in Egypt.

The Board of Trade has recently issued a report by Professor Wyndham Dunstan, F.R.S., Director of the Imperial Institute, on the present position and prospects of cotton cultivation within the British Empire. A sketch map of the 'Cotton Belt' of the world accompanies the report.

In his introductory review of the subject Professor Dunstan emphasizes the need for continued activity in scientific experiment, and the collection of information as to the results of experiments in other countries :—

'The actual cultivation of cotton is an agricultural problem, requiring for its solution chemical and botanical knowledge, in addition to practical experience. The present paramount position of the United States in cotton cultivation is largely due to the operations of its well-organized and splendidly equipped Experiment Stations of the Department of Agriculture, which are continually engaged in the scientific investigation of the innumerable problems which arise, and in the collection and dissemination of information. Since the United States will be the principal competitor with our colonies in the cultivation of cotton, it is important that they should be at least as well provided with the means of scientific experiment and advice. In the first place, it will be necessary to establish in each colony one or more experiment stations, and in many cases seed farms, at which agricultural experiments on cotton cultivation and improvement may be carried on, and where selected seed may be grown for distribution to growers. These stations should be in charge of agricultural experts qualified to carry out these experiments and to give demonstrations of new methods to the native cultivators.'

The first section of the report deals with the cotton plant and its cultivation, including descriptions of the commercial varieties of cotton divided into five groups (American, Egyptian, South American, East Indian, and Nankin).

Then follows an account of cotton growing in the various British colonies in the five continents. In the case of those colonies in which cotton growing has been carried on for some time, full particulars as to yield, exports, prices, etc., are given. In other cases the progress of the experiments that are being carried on is fully reported.

After making a general reference to the experiments that have been carried out by the Imperial Department of Agriculture for the West Indies and to the satisfactory results of these experiments, Professor Dunstan reviews, in detail, the experiments that have been carried on in the various islands. The following extract is of interest :—

'The experimental work now being carried on in the West Indies had the advantage of favourable initial circumstances. Sea Island cotton is indigenous to the West Indies, and Upland cotton, if not actually native, is thoroughly acclimatised. In 1657, cotton was cultivated as a minor crop on many sugar estates in Barbados. Early in the eighteenth century it was of importance in Jamaica, and was also grown in St. Lucia, Trinidad, and elsewhere. So important was the industry in those days that the West Indies were able to furnish about 70 per cent. of all the cotton used in Great Britain. Subsequently, the industry was abandoned, and in 1900 it existed on a commercial scale only in the small island of Carriacou. The principal cause of the abandonment of cotton cultivation was the greater profit to be obtained from sugar cultivation. Owing to the decline of the latter industry, it appears probable that in some parts of the West Indies cotton may now be grown in place of the sugar-cane, whilst in other parts it may form a valuable subsidiary crop, or perhaps be grown in rotation with sugar.

'The problem in the West Indies is thus not the establishment of an entirely new industry, but rather the revival of an old one under economic conditions different from those under which it was formerly carried on with success.

'The conditions prevailing in the West Indies appear to be favourable to the re-establishment of the industry. In many of the islands there is land already cleared, and well adapted to cotton cultivation. Soil and climate are known to be suitable, and, in at least some of the islands, an adequate supply of good labour, a factor of the utmost importance, is obtainable at comparatively low cost. On estates now devoted to sugar the introduction of cotton involves no disorganization of the present cultural system.'

BEE KEEPING.

How to get Worker Comb built.

In *Gleanings in Bee Culture* for May 1, 1904, an interesting article appears in which suggestions are given for preventing spaces in incomplete frames, or spaces caused by cutting out queen cells, etc., from being utilized by the bees for building drone instead of worker comb. For the benefit of those concerned in bee culture in the West Indies, we make the following extracts:—

All colonies which are too weak to store honey to advantage at the beginning of the honey-flow may be treated thus: Their combs are generally all taken from them excepting two, one having a little brood and considerable honey in it, and the other one being as nearly full of honey as possible, giving all the other combs having brood in them to other colonies so that they will be still stronger for the honey harvest. Now put in one, two, and sometimes three frames, having starters in them, or *frames which are partly filled with comb.* These are any combs which may have been started at any time and not completely filled. Or they may be frames once filled with comb, a part of which may be drone comb, which has been cut out, or holes, which have come about by some accidents to the combs, such as mice gnawing them, or the bees tearing them down to get out mouldy pollen or something of that sort; or the bees may have been allowed to build comb when they were not in the condition to build worker comb conclusively.

If not too strong, the bees will generally build comb of the worker size of cells till the brood begins to emerge from the eggs first laid in the newly built combs by the queen; but as soon as many bees emerge they are liable to change to the drone size of cells; or if the little colony is quite strong in bees they may change the size of cells sooner than this, if honey is coming in very rapidly,

As soon as the first frames are filled with comb, find out how many bees they have; and if they are still well stocked with bees, or are in a shape where a change of the size of cells may be expected before they reach the bottom of any frames started with worker comb, take away any full frames they may have already built. This will put them in almost the same condition as when first started, except that it would be well to give them, at the same time, a comb containing mostly honey with some emerging brood (if they have such a comb it is left with them, which is more often the case than otherwise) from some other colony, when they are ready to work the same as before.

If not so strong but that they will build worker comb still longer, instead of taking the brood away, spread apart the combs now built, and insert one or more frames with starters, between, when these will generally be filled with worker comb before enough young bees emerge for them to change the size of cell. Should they have changed the size of cell into drone comb, the combs they then have, all except the one mostly filled with the honey, are to be taken away so that they may feel their need of worker brood again, when they will build cells of the worker size once more.

PREVENTION OF TROPICAL DISEASES.

In his lecture at the West India Committee Rooms on 'The Disease Problem of the West Indies,' Sir Patrick Manson summed up his suggestions for the prevention of tropical diseases as follows:—

I have two suggestions to make. The first is that a well-equipped laboratory, with an able and experienced director with suitable assistance, be established at some central and otherwise suitable point in the West Indies. The director is of more importance than the laboratory. This is a fundamental principle too often lost sight of in establishing such institutions. More money is spent on the bricks than on the brains. The result is a splendid building that looks well but yields nothing. I would suggest, then, a first class director, a sufficient staff, and a modest laboratory to be devoted to the study of the causes and prevention of the diseases of man and the domestic animals in the West Indies.

The other suggestion I would make is one that I have urged on more than one occasion. Hitherto, I am sorry to say, I have been crying in the wilderness. The suggestion has reference to the application of the knowledge we already possess about tropical diseases, and of such additional knowledge as we may become possessed of in the future. It is that every boy and girl in every school in our West Indian Colonies be taught the leading facts on which a rational system of tropical sanitation might be founded. The idea is a perfectly practicable one. To carry it out would cost next to nothing. The good that would ensue would be immense. The educational machinery in the shape of teachers and schools already exists. All that is required would be a short course of instruction to the teachers, a few diagrams and two or three additional pages in the current school books. It ought not to be difficult to put into simple language the story of malaria, of filariasis, of yellow fever and their relations to the mosquito, the story of the ankylostome of the tubercle bacillus and of other important disease germs. If well done by a skilled litterateur, it would read like a fairy tale and sink into the minds of the children to be a guide to them in their future lives. It is only by catching the negro young that you will ever wean him from his silly traditions about disease, far less get him to believe in and act on the great facts to which I have alluded. Instil these facts and ideas into the young negro mind, and he will stick to the truth as obstinately as he now sticks to nonsense. You might preach for ever to the grown-up man negro about the virtues of fresh air, he will stuff the keyhole as soon as your back is turned; you might preach for ever to the old grannie negress about the merits of a clean house and a dry compound, she will still pin her faith to dirt and bush medicine and stuff the babies with pap. It is useless to attempt the sanitary reform of the adult negro. He is more wedded to his old ways and more obstinate and stupid than even an average Englishman. Bring the child up in the way it should walk is advice just as good for the body as it is good for the mind. The end and purpose of education is the benefit of both.

Were these suggestions carried out, I feel convinced that in a few years incalculable benefit would result to the West Indies. Not only would much suffering be avoided and many lives saved, but energies at present repressed by preventible disease would be free to assist in the development of countries whose natural resources might long ago have placed them in the fore-front of our colonies.

Other extracts from the lecture have already appeared in the *Agricultural News* (Vol. III, pp. 139, 157 and 166).

DISEASES OF PLANTS.

Citrus Trees.

Mr. P. H. Rolfs in *Bulletin* No. 52 of the Bureau of Plant Industry (United States Department of Agriculture) gives an account of some diseases of citrus fruits and trees caused by *Colletotrichum gloeosporioides.*

The fungus has long been known to be the cause of 'withertip' on orange and lemon twigs, and the same fungus causes a 'leaf spot' of these and other citrus trees. It is now shown by Mr. Rolfs that this fungus is also the cause of the 'anthracnose' of lime flowers and young fruits of lime and lemon twigs, also of 'spot' of ripe lemons and 'canker' of limes.

With the lime, infection usually occurs at the axil of the leaf and the fungus then cuts off the stem, so that the upper part falls over and either hangs down or drops off. Gum, in such cases, is quickly formed at the wound and the fungus does not spread down the twig. The fungus may also enter by the terminal bud or by the leaves, in which case the tip dies back for a distance or even as far as the main trunk (wither-tip). The flowers may also be attacked, in which case the disease may prevent any fruit being formed on a tree. Young fruits may also be infected and when this happens a large percentage of it falls.

With the orange, the leaf is the first point attacked and spots of various kinds are produced. From the leaves the fungus spreads to the young twigs and gives rise to wither-tip. The fruit of the orange, apparently, is not attacked.

The following account of the treatment of lime trees shows what can be done by remedial treatment for this disease:—

'During the past year experiments performed by Mr. M. S. Burbank, of Cocoa-nut Grove, Florida, at the Red Mill fruit farm, with a view to protecting lime trees from the attacks of this fungus, brought out some interesting results. One tree under observation had been producing limes for a number of years in a most prolific manner, but during the three years preceding 1902 the crop had been a total failure, owing to the attacks of *Colletotrichum gloeosporioides.* Spraying with Bordeaux mixture was begun in September 1902 and was continued at intervals as thought advisable, and in less than a year the disease had been almost entirely subdued, and the tree bore a heavy crop of fruit. Other trees were also treated, as well as trees in other groves, with good results.'

In a small orchard, especially a young one, cutting out diseased twigs and picking diseased leaves reduce the disease considerably or may even eradicate it. The picking and pruning must, however, be done thoroughly and at frequent intervals.

Thorough cultivation and manuring are of great value in reducing the amount of damage done by the disease, and also will reduce the probability of infection.

Tobacco.

In *Bulletin* No. 51 (Part 1) of the Bureau of Plant Industry (United States Department of Agriculture), by Mr. R. E. B. McKenney, a preliminary account is given of a wilt disease of tobacco.

The disease is apparently due to a fungus similar to those that cause wilt in cotton, water melon, tomato, etc. It is a species of *Fusarium* (*Neocosmospora*).

The disease does not appear until the plants have made about one-third of their growth. The first sign is the sudden wilting or drooping of one or more of the leaves; this wilting is permanent and is followed by a withering of these leaves. Generally this is followed by wilting and withering of all the leaves of the plant. Later, the base of the stem blackens and rots and at the same time the roots will be found blackened and often soft and 'mushy.'

The *Fusarium* is a soil fungus and gains access to the plant by the fine roots.

Nothing can be done to save a plant once it has been attacked, so that all methods must be preventive.

Tobacco should not be planted on an infested field for a period of five to eight years, as the *Fusarium* is capable of living in the soil for that length of time.

All care should be taken to prevent fresh fields becoming infected. For this purpose all diseased plants should be burned on the field where they are grown, and tools used on an infected field should be cleaned. None of the diseased tobacco should be mixed with manure or compost heaps.

It is to be hoped that this disease will not appear in tobacco grown in the West Indies, but if it does, prompt efforts on the lines suggested above should be made to exterminate it.

English Potato.

The diseases of this plant are not of so great interest to West Indians as are those described above. Still a short account of a disease which is widely distributed in the United States may be of interest. It is fully described in *Bulletin* No. 55 of the Bureau of Plant Industry (United States Department of Agriculture) by Messrs. Erwin F. Smith and Deane B. Swingle.

This disease is also due to a *Fusarium.* The fungus attacks mainly the underground stems and roots and is characterized by a blackening of the vascular bundles.

The disease in the tubers nearly always begins at the stem end and is shown by a browning or blackening of the vascular bundles. Externally the tubers now appear quite sound. The dark stain finally grows on to the eye end of the tuber. The parenchyma may remain sound and white for some time, or it may become yellowish and finally shrivelled, greyish brown and hard, or it may break down with other soft rots. The disease continues in stored potatos, especially when they are stored in warm rooms. As precautionary measures, no diseased tubers should be planted; they should be used early in the season; they should not be thrown on the compost heap; infected land should be rested for some years.

Spanish Needle. In a paper in the *Bulletin of the Jamaica Department of Agriculture* on 'Jamaica Fodders,' to which reference was made in the *Agricultural News* (Vol. II, p. 409), Mr. Cousins gives the results of an analysis of Spanish needle (*Bidens leucantha*) and mentions that it has slight purgative properties and is useful as a medicine for horses in poor condition or suffering from worms. In his note on the use of thymol for worms in horses (see *Agricultural News*, Vol. III, p. 157) he recommends that a feed of Spanish needle be given after the administration of the thymol. Again, we find Mr. Barclay in the note on rabbit diseases published on p. 203 of this issue, recommending this plant for feeding to rabbits suffering from constipation or diseased liver. Stock owners would therefore do well to make use of this very common plant.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 175 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

VOL. III. SATURDAY, JUNE 18, 1904. No. 57.

NOTES AND COMMENTS.

Contents of Present Issue.

As announced in the last issue our sugar notes this time include a return, published by the British Guiana Board of Agriculture, showing the area under varieties of cane, other than Bourbon, in that colony. It will be noticed that the greatest acreage is occupied by D. 109, followed by the White Transparent and B. 147.

Cotton notes include a circular letter recently issued by the Superintendent of Agriculture for the Leeward Islands on the supply of Paris green. There is also an account of the cotton ginnery at Hartlands, Jamaica, and an abstract of Professor Dunstan's recent report on cotton cultivation in the British Empire.

A letter from Messrs. Pink & Sons dealing with the suitable crating of bananas is published on p. 196.

On p. 199 an account is given of a fungus that does great damage to the different varieties of citrus trees in several ways. On the same page a wilt disease of tobacco and a root disease of English potato will be found described. The treatment of wounds on cacao trees is dealt with on p. 195.

The Insect Notes include extracts from Mr. Ballou's report on a recent visit to St. Vincent and an article on onion thrips. Under Bee Keeping, we publish an article on the production of worker comb.

Mr. J. Russell Murray's report on West Indian products in Canada, during April, is on p. 206.

An article on the cultivation of the castor oil plant and the expression of the oil is to be found on p. 203.

Lectures on Cotton Cultivation.

In further reference to the lectures on cotton growing which are to be given shortly throughout the West Indies, it might be mentioned that seven sets of lantern slides, each consisting of thirty-seven slides, illustrating the various stages of the cultivation and treatment of cotton, have been prepared. A set of these will be sent to each of those islands in which a large area is being devoted to cotton, the remaining sets being intended for circulation among the smaller islands.

Extra copies of the new pamphlet entitled: 'A.B.C. of Cotton Planting,' will be available for distribution in connexion with these lectures.

New Department Publications.

Two new pamphlets (Nos. 30 and 31) have been prepared. The former, entitled: 'Manurial Experiments with Sugar-cane in the Leeward Islands', is issued to-day. This consists of the summary of conclusions contained in Part II of the large official report recently issued on the sugar-cane experiments conducted in the Leeward Islands in the season 1902-3, under the auspices of the Imperial Department of Agriculture for the West Indies. These results have already been reviewed in the *Agricultural News* (see Vol. III, pp. 138 and 145-6).

Pamphlet No. 31 ('A. B. C. of Cotton Planting') contains, as was mentioned in our last issue, useful information on cotton cultivation, arranged in the form of a catechism, for peasant proprietors and small settlers.

These pamphlets will be on sale by all Agents of the Department (price 4*d*. each, post free 5*d*.)

The Value of a Demonstration Farm.

Dr. S. A. Knapp, in *Bulletin* No. 51, Part II, of the Bureau of Plant Industry (United States Department of Agriculture) gives the results of the working of a demonstration farm started by the citizens of Terrell, Texas. The object of the farm was to test the benefits to be derived from the rotation of crops, thorough cultivation, proper manuring, etc.

A fund was subscribed by the citizens, and a committee of eight practical men was elected to see the work properly carried out. A capable farmer was chosen to conduct the demonstrations on his own farm and was to be re-imbursed for any financial loss he might sustain. The whole was under the direction of Dr. Knapp, the representative of the Department of Agriculture. The experiments were carried out with cotton and Indian corn, the ordinary crops of the locality.

The result of this experiment, on 70 acres of land, was that the farm manager stated that 'he had cleared $700 more than would have been made under the ordinary methods of farming employed in that section.' He also stated that he intends to work his entire farm, about 800 acres, next year, on the basis of the cultural methods employed in the experiments, and many other large owners of land have expressed similar intentions.

West Indian Sugar in Canada.

We publish on p. 206 a report by Mr. J. Russell Murray, of Montreal, in which attention is drawn to the disadvantage at which the better grades of sugar are placed in the Canadian market under existing conditions.

It will be seen that Mr. Murray advocates a polarization test instead of one based on colour. In his opinion such a change would bring about a greatly increased demand for fine yellow syrup sugars and yellow and white crystals, which are practically debarred from entering the Dominion under present conditions, since, on account of the high rate of duty it is practically impossible for them to compete with the syrup sugars produced there.

These sugars, grading beyond the 16 Dutch Standard, have to pay an extra duty of 43c. per 100 lb., over and above the duties levied on sugars below 16 D.S.

Diseases of Guinea Corn in Madras.

Bulletin No. 49 of the Madras Agricultural Department is devoted to the diseases of guinea corn (*Sorghum vulgare*) in the presidency. This is a staple of first importance, as it is estimated that 6,000,000 acres are devoted to its cultivation.

The sorghum fields are subject to a variety of diseases—insect and fungoid—some of which have an evident and disastrous effect on the crop.

One of the principal diseases is the 'smut,' and considerable losses occur annually from smutted grain.

There is also a fungoid disease causing a reddening of the leaves, which is probably identical with that attacking canes in the West Indies.

There are also a number of animal parasites of sorghum, and these include borers, plant lice, etc., while much damage is caused by the presence of weevils in stored grain.

Camphor and the Camphor Industry.

As mentioned by Mr. J. R. Jackson in his monthly reports on the London Drug and spice market, the war in the Far East has already caused a rise in the price of camphor, and considerable unrest is felt in the markets with regard to this product.

Interesting notes on camphor cultivation were recently given in the *Gardeners' Chronicle*. The principal source of camphor is *Cinnamonum Camphora*, a native of China and Japan. This tree is very plentiful in the interior of the island of Formosa, as well as in Japan and Central China.

In obtaining camphor the trunks and larger branches are usually cut into chips: these are boiled in large vessels over which are inverted earthenware pots. Into these the rising steam carries the camphor which is deposited in crystals around the sides of the pot. These are afterwards scraped off and placed in chests lined with lead or tinned iron. The camphor is exported in this form to England, where it undergoes a refining process.

Plantain Fibre and Manila Hemp.

A brief reference was made in the *Agricultural News* (Vol. II, p. 268) to a bulletin issued by the Madras Agricultural Department, containing notes on 'Simple Machines for extracting Plantain Fibre.' It is stated that the object of this bulletin is 'to draw attention to the common plantain as a latent source of fibre, and to furnish information about the two types of primitive machines which are believed to be in common use by the peasants in the Philippine Islands for extracting Manila hemp.'

It should be mentioned that these machines do not appear to be used on a commercial scale, and that, while they may prove of some value in India, where labour is cheap, they are not likely to be suited for conditions in the West Indies. Further, plantain fibre is not likely, in any case, to compete with Manila hemp.

Attempts to grow the Manila hemp plant outside the Philippine Islands have not proved successful for the reason that the two essential conditions for its successful cultivation are (1) virgin land and (2) an almost continuous rainfall. Even in the island of Luzon, where Manila hemp is principally grown, it is found that this plant thrives only on one side of the island; on the other side, the conditions mentioned are not present.

Vegetable Products of Liberia.

In the *Consular Report on Liberia* for 1903, Mr. Consul Mac Donell states that the resources of that country appear to be little known: a list of the principal natural products is therefore given. The following brief summary is likely to be of interest:—

Cotton is indigenous, and the wild cotton is used in the manufacture of native cloth. There is no doubt that cotton would grow well, if properly cultivated: but the difficulties in the way of starting a successful industry are the cost of labour, the necessity for care and attention, and the expense of clearing the virgin forest.

There are, no doubt, great possibilities for a rubber industry, but it will be necessary to teach the natives the proper methods of tapping and extraction.

The timbers of Liberia should prove a considerable source of wealth, when the forests are opened up.

There is an export trade in piassava, the price for this fibre ranging during the year from £9 to £33 15*s*. Piassava is obtained from the raphia palm, which, on being cut down, is allowed to rot, and the fibre extracted.

The value of coffee has fallen so low that farmers scarcely ever trouble to harvest their crops, although formerly this was the principal export of the country. Liberian coffee is of very good quality, and would undoubtedly obtain high prices, if better known.

Attention has recently been given to the cultivation of ginger. Considerable quantities of palm oil and palm kernels are also shipped.

Other products of Liberia, which are, however, cultivated only for home consumption, are chillies, Calabar beans, kola nuts, cacao, annatto, etc.

INSECT NOTES.

St. Vincent.

The following extracts are taken from a report, dated May 23, by Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, on a visit recently paid to St. Vincent:—

At the Agricultural School no serious attack of insect pests was noticed.

The cotton which was attacked by the leaf-blister mite had all been pulled out and burned, and no evidences of the presence of this pest were to be seen.

A papaw tree in the garden plots was seen to be attacked by the white scale (*Diaspis amygdali*). A few specimens of the golden weevil (*Diaprepes spengleri*) were collected. This species is closely related to the lady-bird root-borer of the sugar-cane (*Diaprepes abbreviatus*) and was very abundant last year in June when I visited St. Vincent. The appearance of a few specimens at this time would indicate that May and June are the season for the emergence of the adult. The food of the larva is not known, but it is probably a borer or root feeder. The adult has a variety of food plants, being found this year principally on citrus plants, and last year on pigeon pea and a few cruciferous plants.

At the cotton factory large numbers of cotton stainers were seen feeding on cotton seed which was scattered about the ground. This would be a good opportunity for trapping and killing these bugs in large numbers. When they are collected on the cotton seed, they might be killed either with hot water or kerosene.

At the Botanic Station very few insects were to be seen in sufficiently large numbers to do any damage. The most noticeable case was that of several Liberian coffee trees attacked by the Shield scale (*Lecanium hesperidum*). Mr. Sands was recommended to try on these trees Lefroy's mixture (crude Barbados oil, and whale oil soap). In the nursery a few insects were noticed. These were all in very small numbers, however, and evidently held well in check by spraying.

Many of the plants in the gardens are sprayed every week and, with the exception of the coffee trees already mentioned, good results seem to have been accomplished.

Onion Thrips.

American Gardening of May 7, 1904, contains an interesting account of the onion thrips (*Thrips tabaci*), of which the following is a brief summary:—

This pest received its specific name from the fact that it was first observed in Europe attacking tobacco. In 1872, Dr. Packard called attention to it as a serious pest of onions in eastern Massachusetts where the damage in one county alone amounted to $10,000. Comparison by experts proved that the onion pest of the New World and the tobacco pest of Europe were identical.

REMEDIES.

Ivory sulphur suds: This mixture is made by dissolving 1 lb. of ivory soap in ½ gallon of boiling rain water and stirring in 1 lb. of flowers of sulphur, while the soap solution is still hot. This is the stock solution. For use, 1 pint is dissolved in a little hot water and made up slowly to 4 gallons. This wash can be sprayed on to the leaves and in addition to its insecticidal properties it would probably have some effect in preventing attacks of fungi, which might enter through the punctures made by the insects. A few days after the application of the soap-sulphur wash, clear water should be sprayed on to the plants. A heavy shower in the meantime would probably make this unnecessary.

Tobacco: Refuse tobacco, tobacco stems and tobacco dust may be used in solution or dry. The solution is prepared by soaking tobacco stems or refuse in cold water for a day or two, and using the liquid as a spray.

Whale oil soap: This is also mentioned as efficient at the rate of 1 lb. of soap to 8 gallons of water.

These washes have all been tried in greenhouses with success on several species of thrips, and it is believed that they would be equally efficient in the onion field. Tobacco, applied dry as a dust and as a mulch about the plants, has also given good results.

CULTURAL METHODS.

Professor Webster found the onion thrips in Ohio breeding in the grasses and wild plants in the vicinity of onion fields and in the refuse left on the onion fields. As an essential cultural method, therefore, it is recommended that the edges of the fields be kept free from all weeds and plants on which this pest might breed. Professor Webster is quoted as saying: 'It has been demonstrated that the insect can be destroyed by spraying the plants along the edge of the onion fields when they first begin to show the effects of attack, using 1 lb. of whale oil soap to 8 gallons of water.'

These remedies seem to have been more successful in the United States of America than in the West Indies, where they have all been tried except the soap-sulphur wash. In addition to these the soda-sulphur wash has been tried, and while it has perhaps given better results than the others, yet it has not been entirely successful. This is made by boiling 2 lb. caustic soda and 1 lb. sulphur in a small amount of water till dissolved. This forms stock solution sufficient for 10 gallons of spray.

References to thrips of onions and cacao will be found in the *West Indian Bulletin* (Vol. II, pp. 176 and 288) and in the *Agricultural News* (Vol. II, p. 88, and Vol. III, p. 10.

THE AGE OF EGGS.

An ingenious method for determining the age of eggs has been awarded a medal by the National Society of Poultry Breeders of Saxony It is well known that the air cavity at the blunt end of the egg enlarges as the age of the egg increases, consequently, if an egg be placed in a 1:2 solution of common salt, it will have an increasing tendency to float with the long axis vertical. A scale of angles is placed at the back of the salt bath, and, from the inclination of the egg to the horizontal, the age can be gauged almost to a day. A new-laid egg lies horizontally on the bottom of the vessel, when three to five days old the blunt end is raised, so that its long axis makes an angle of about 20° with the horizontal, at eight days this increases to 45°, in fourteen days to 60°, and in three weeks to about 75°, while in a month it stands upright on the pointed end. (*Scientific American.*)

CASTOR OIL PLANT.

In view of the efforts that have been made in some of the West Indian Islands to encourage the cultivation of the castor oil plant, more especially where the oil is desired for soap making, the following extract from the *Queensland Agricultural Journal* for April is likely to be of interest:—

The castor oil plant (*Ricinus communis*) is a native of all warm countries. It is very hardy, and will thrive on almost any soil and in any situation, attaining a great height in one season after sowing the seed. The plant likes dry soils. The seeds should be sown in rows, 6 feet apart, and 4 feet in the rows. Before sowing, the seed should be steeped in hot water for twenty-four hours. After the plants are above ground, the cultivation is the same as for corn, cotton, or tobacco.

When the seed-pods are ripe, they suddenly burst open and scatter the seeds in all directions. Special arrangements must, therefore, be made for harvesting them. When the pods are seen to be turning brown, the spikes which bear them are cut off and taken to a clean-swept piece of hard ground which may be enclosed with galvanized iron. Here they remain, being turned occasionally until the pods have emptied themselves. The husks are then removed by winnowing, and the beans swept up and bagged. They must on no account be allowed to get wet. This work is so light that it can be done by young children.

The yield of beans varies between 20 and 30 bushels per acre. The oil is extracted by means of a hydraulic, a screw, or a lever press. What is known as 'cold-drawn castor oil' is that obtained by mere pressure. The first thing to do is to remove the external hull. This is effected by passing the beans through two revolving rollers, set in such a way as merely to crack the hull, which is then got rid of by winnowing. The decorticated seeds are then put into coarse hempen bags about 2 feet in diameter. Between each layer of bags there is placed a steel plate, and about 20 or 30 bags, each holding about 40 lb. of seeds, are placed on top of each other in the press. The pressure must be applied gradually, and the oil running from the first press is the best. As the pressure is increased up to the full power of the press, a second quality is produced. The pulp after this is taken out, mixed with hot water, and again pressed to obtain the third quality. The oil from the mill runs into a receptacle below. Another method is to place the beans in a stone roller-mill. This consists of two large, round stones connected by a spindle, which are revolved by horse-power in a hollow round stone, in which the beans are placed. These stone mills hold about 2 cwt., and this quantity is crushed every half-hour. I saw one of these mills working in Egypt, and another in Ceylon, and they are very effective. The oil is poured into filtering bags, and the pure oil runs from the shelves on which the bags are placed through tubes into vessels placed to receive it. The yield of oil varies from 40 to 60 per cent., but the average yield is usually 40 per cent.

The oil cake makes excellent manure. The usual price of castor oil for lubricating purposes—not medicinal—is from 2*s.* 9*d.* to 3*s.* per gallon. From 1,000 lb. of seed about 50 gallons of oil are produced. Thus, if the produce of 1 acre of castor oil plants is 1,000 lb., the return would be £7 10*s.* But this is merely an approximate return, which must necessarily vary under different conditions. The first oil expressed—that is, that known as 'cold-drawn'—is the medicinal oil, which sells at a much higher price than the second and third qualities.

DISEASES OF RABBITS.

The May issue of the *Journal of the Jamaica Agricultural Society* contains a short article on some common diseases of rabbits, adapted by Mr. Barclay from *Farm, Field and Fireside*:—

Cold in the Head: This is often caused by a crack in the hutch which causes the rabbit to be always in a draught. See to this at once. If the rabbit has taken cold, it will be constantly sneezing and running at the nose. Give warm food, such as bread and milk, boiled sweet potatos, served warm, mixed with a little corn meal; in each feed put eight drops of sweet spirits of nitre, and if the rabbit will not eat its food when this is mixed with it put the spirits of nitre in a little milk and pour down its throat.

Constipation: This complaint only makes its appearance when there has been a lack of herbaceous food. The rabbit is seen sitting in one corner of the hutch taking no notice of food, and sometimes the body is swollen. It must be tempted to eat some green food, such as Spanish needle, 'Rabbit Feeding,' or cabbage leaves. Should this fail to bring about the desired result, pour a little salt and water down its throat; put in just enough salt to make the water saline, and put a few drops of 'Healing Oil' in it.

Diseased Liver: This is a complaint the rabbit keeper must be on the look out for, as any sign of diseased liver will spoil the sale of his produce. With this disease there is difficulty in breathing which is heavy and sometimes audible, and the rabbit should at once be killed. It is little use trying to doctor, in fact, it is not worth the trouble unless the animal is a very valuable one. In case a remedy is wanted, the following will be useful:—Give twice a day a teaspoonfull of castor oil, and give plenty of young 'Spanish needle' amongst the green food. As preventives, do not allow the rabbit to eat off the floor, and avoid feeding corn.

Dropsy or Pot Belly: One of the commonest of rabbit diseases to which the young stock are most liable. The principal causes are an excess of wet green food in large quantities, or a large quantity of the same, fed at irregular hours, or hutches too small. The animal's body becomes swollen, as the rabbit will keep on eating, if allowed; the complaint is aggravated, and death soon ensues. The treatment should be as follows:—Induce it to have a run on dry ground; give dry food, such as a few peas, (leaves of the banana or plantain tree are good) and give a little parsley, thyme, or sliced carrots; but any green food or roots must be given sparingly. A proper allowance of sweet hay and corn with the green food, fed at regular hours, is the prevention.

DEPARTMENT NEWS.

Mr. Joseph Jones, Curator of the Botanic Station at Dominica, left that island on Thursday, June 2, for England on leave of absence.

Mr. J. C. Moore, Agricultural Superintendent at St. Lucia, was also a passenger for England by the R.M.S. 'Atrato' on leave of absence. During Mr. Moore's absence, Mr. F. E. Bundy, Inspector of Schools, will act as Agricultural Superintendent.

On the recommendation of the Imperial Commissioner of Agriculture for the West Indies, the Secretary of State for the Colonies has approved of the appointment of Mr. Murrell B. Connell, as Assistant Clerk on the staff of the Imperial Department of Agriculture.

GLEANINGS.

On Empire Day a group of cabbage palms was planted in the central portion of the Botanic Station at Tobago.

The principal exports from Pondicherry are ground nuts, oil cakes, rice, and oils (ground nut, cocoa-nut, castor, and sesame).

Carbon bisulphide is being used with great success against the parasol ant in Tobago. Repeated applications are being received at the Botanic Station for this insecticide.

The cob stallion 'Jamaica Lad,' imported into Dominica by the Imperial Department of Agriculture, is now stationed at Picard estate, Portsmouth, and will serve approved mares at a fee of 10*s*.

During the quarter ended March 31, 1904, 531 bales and 74 bags of cotton were exported from the British West Indian Colonies. The total weight was 145,036 lb., and the estimated value £5,440 1*s*. 6*d*.

The Jamaica *Leader* advocates the planting of the Ripley variety of pine-apple. It fetches from half as much again to twice the price of other kinds, weight for weight : it is also a good shipping pine and sells well in British markets.

At a meeting of the Nevis Agricultural and Commercial Society, Mr. W. S. Maynard mentioned that his first shipment of cotton had been favourably reported upon, the account sales showing that the price had ranged from 1*s*. 3*d*. to 1*s*. 4*d*. per lb.

Essence of orange leaves is a not unimportant article of commerce. It is used in perfumery and soap manufacture. Most of it comes at present from South America, but there is no reason why it should not be produced in Jamaica. (Jamaica *Leader*, May 20, 1904.)

Professor F. S. Earle, of the New York Botanical Garden, has been asked by the Cuban Government to aid in the establishment of a Department of Agriculture. He has been granted leave of absence from the Garden for this purpose. (*Botanical Gazette*, May 1904.)

A circular recently issued by the Reporter on Economic Products to the Government of India gives the results of an analysis of rice-husk ash from the rice mills of Burma. It is stated that the fertilizing constituents are not very largely represented, but the return of the ash to the land would be a distinct improvement. The silicious ash might also, it is suggested, be employed in manufacturing mortars and cements.

According to the *Sugar Planters' Journal* of May 21, the number of beet sugar factories in the United States has increased from 43 at the close of 1902, to 56 at the beginning of 1904.

The Berbice Cotton Growers' Committee is proposing to hold a show in New Amsterdam late in October or early in November. Prizes of $100, $50, and $25 are being offered for the best three bales of Sea Island cotton of not less than 250 lb. A number of other prizes will also be offered.

Mr. Wm. Seabrook, a cotton gin expert, arrived in Jamaica last week and has done some valuable work in the island. He has fitted up a steam gin on Mr. Fursdon's property at Hartlands and given advice to those who cared to consult him. (Jamaica *Leader*, May 20, 1904.)

Mr. J. H. Hart writes : 'The mango crop in Trinidad will be short this year. Such varieties as Pere Louis, Gordon, Divine, Mango D'or, Peters or Bombay, Malda, No. 11 or Reine Amelie, and other imported kinds have not more than 25 per cent. of an average crop on them, while even the commoner kinds have not half the usual crop.'

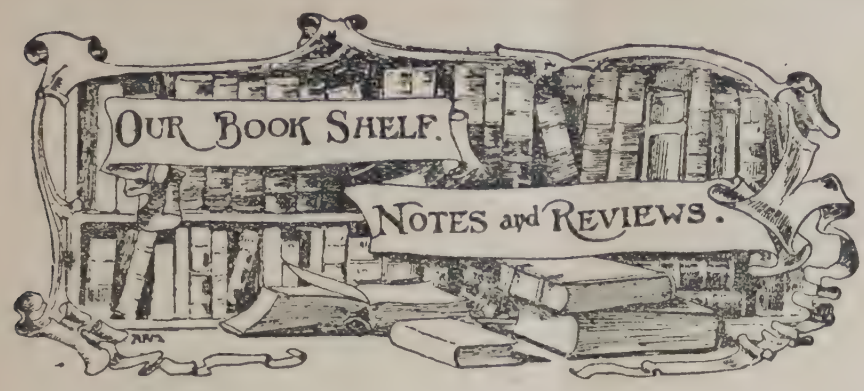
India rubber was exported last year from the French colony of Guinea to the amount of 1,467 tons, representing a value of more than £580,000. Only half this sum was realized in 1900 with nearly the same quantity ; and the increase in value is explained by the improved quality due to more careful collection and preparation. (*Journal of the Society of Arts.*)

Field of May 14, discusses the merits of bananas from various parts of the world. While it is held that the Canary banana is of finer quality than that from Jamaica, the Barbados bananas are reported to be even better still. The flavour is much liked in the British market, where they are preferred to the Martinique or Gros Michel bananas exported from Jamaica. (*West India Committee Circular.*)

Five packages of cotton were shipped to England yesterday in the Direct Line steamer. This is the first shipment of cotton that has been made to England for a great many years. The cotton has been inspected by several parties who have pronounced it to be much superior to the ordinary cotton shipped from American ports. (Jamaica *Gleaner*, May 30, 1904.)

Recent issues of New York papers contain the announcement of the discovery of a very effective enemy of the cotton boll weevil in Guatemala and Mexico. This is a large, reddish-brown ant which is described as feeding systematically on the weevil larva. The U. S. Department of Agriculture is said to be arranging for the introduction of this ant into the cotton-growing districts where the boll weevil is such a serious menace to cotton growing.

The total value of the sugar exported from the British West Indies to all countries was £2,740,808 in 1899-1900 and £2,101,988 in 1902-1903. The figures for the United Kingdom were £619,642, and £434,486 in the two years, and for the United States £2,067,615 and £1,482,033 respectively, thus more than accounting for the total reduction of £638,826. The shipments to Canada, on the other hand, rose from £51,312 to £173,008. (*Our Western Empire*, May 1904.)



EENIGE PATHOLOGISCHE EN PHYSIOLOGISCHE WAARNEMINGEN OVER KOFFIE: door Prof. Dr. A. Zimmermann. *Batavia: G. Kolff & Co., 1904.*

This book gives a very complete account of the diseases of coffee, based upon the author's observations while in Java.

The most important insect pest described is *Pentatoma plebeja*, a sucking insect that attacks leaf and stem. Full accounts are given of the disease phenomena, of the entomological study of the insect and of the anatomical investigation of the injuries caused by its attack. The other insect pests described are a few bugs, all with the same habit of feeding as *Pentatoma plebeja* and all causing similar injury.

A full account is given of the fungoid disease caused by *Hemileia vastatrix*, which has done so much damage in coffee plantations in Ceylon and elsewhere. The disease attacks the leaves principally.

Other leaf diseases described include those caused by *Gloeosporium Coffeanum*, *Coniothyrium Coffeae*, *Colletotrichum incarnatum*, *Cercospora Coffeicola*, etc. In each case a full account is given of the fungus and of the disease phenomena.

A number of stem diseases are also described and figured. Among these is the disease caused by a Basidiomycete, *Corticium javanicum*, one caused by *Necatur decretus*, first noticed by Ridley in the Straits Settlements, and a disease known as the 'scheurziekte' (splitting disease) which produces cracks in the stem.

A brown root disease apparently caused by a hitherto undescribed fungus, *Sporotrichum radicicolum*, is described, as also two other root diseases, the 'spleetziekte' of *Coffea liberica* and a white root disease of the same variety.

Quite a number of fungi are described as attacking coffee berries, among them being *Hemileia vastatrix*, mentioned above, *Pestalozzia Coffeae*, *Corticium javanicum*, etc.

The book concludes with some chapters on various morphological and physiological peculiarities and abnormalities of the coffee plant.

The publication is well illustrated both by numerous text figures and by four plates.

A RESEARCH ON THE EUCALYPTS, especially in regard to their Essential Oils: by R. T. Baker, F.L.S. (Curator and Economic Botanist), and H. G. Smith, F.C.S. (Assistant Curator and Chemist). *Published by authority of the Government of the State of New South Wales, Sydney. 1902.* Price 15*s*.

It is a difficult matter in a short review to give any idea of the varied and important contents of a work like this, which is practically an Encyclopædia of the Eucalypts of New South Wales. Of 120 species described for that state, 111 have been investigated by the authors.

The book opens with an account of the classification adopted. The characters used in determining the species are—the field characters of the trees, the characters of the barks and timbers, the morphology of the fruits, leaves, buds, etc., and the chemical properties and physical characters of the oils, dyes, kinos, etc. Previous classifications had been based upon purely morphological features, and this has led to great confusion in recognizing Eucalypts, many of the species appearing to show great variation. According to the authors' investigations, species founded on the characters given above are quite constant and can easily be recognized.

Following this there is a chapter on the probable evolution of the Eucalypts as revealed by this natural system of classification.

The main body of the work is occupied with a description of the 111 species and their essential oils, the sequence of the species being based on both botanical and chemical results. The genus is divided into seven groups according to the characters of the oils. Group I, for instance, contains those 'Eucalypts which give an oil consisting largely of pinene, without phellandrene, and in which eucalyptol is almost or quite absent.' Group IV, again, contains those 'Eucalypts which yield an oil consisting largely of eucalyptol, pinene and aromadendral, but in which the eucalyptol does not exceed 30 per cent., phellandrene is absent.'

The description of each species includes an account of the botanical characters of the plant, notes on the characters of the timber, the habitat, remarks on any points of interest connected with the species or its products, and an account, physical and chemical, of the essential oil.

Next we get a thorough chemical and physical account of each of the various constituents of the different Eucalypt oils. These include eudesnol, aromadendral, eudesmic acid and its amyl ester, piperitone, pinenes, etc. Some of these substances have been isolated by the authors for the first time.

Another interesting chapter is that on the 'Extraction of Eucalyptus Oil in Australia.' Accounts are given of different kinds of machinery used for extracting the oil. This chapter is illustrated by a number of very fine plates, reproduced from photographs.

To anyone who is at all interested in this very useful and ornamental group of plants, this work may thoroughly be recommended as containing all the information he is likely to be in want of.

AGRICULTURAL SHOWS.

British Guiana.

The Demerara *Daily Chronicle* of June 1 contains a full report of the Agricultural Show held at Belfield on May 23, of which the following is a brief summary:—

The weather was very unfavourable, but the exhibition disclosed a decided improvement in the quality of the exhibits as compared with the previous show.

Specimens were exhibited by the Board of Agriculture for the guidance of competitors, and these made a very good display.

In the fruit section, the grapes were of good quality and size, the oranges were poor; but there were satisfactory exhibits of sapodillas, water melons, mangos and citrus fruits other than oranges.

Among the vegetables there was a good exhibit of onions from Carlton Hall plantation.

An improvement was noticed in the poultry class, the exhibits in this class being decidedly good.

WEST INDIAN PRODUCTS.

Canada.

The following is Mr. J. Russell Murray's report on the trade in West Indian products in Canada during the month of April :—

Business development was slower than anticipated, and a cold wave delayed the breaking up of the ice on the river; as a consequence, it was not until the 4th. inst. that the first steamer reached Montreal.

WEST INDIAN RECIPROCITY WITH CANADA.

This important factor for the developing of trade cannot be too earnestly taken up among the islands. In the interest of the sugar planters it is of the utmost importance, as it will make an opportunity for a reviewing of the sugar duties which are at present entirely in favour of the refiners here. Under present conditions only dark sugars, under 16 Dutch Standard, can be imported with any prospect of success, while all the fine yellow syrup sugars, white and yellow crystals, are entirely excluded. Under present conditions, dark sugars 89 degrees basis pay, after allowance for preference, 41c. per 100 lb., while those over 16 Dutch Standard have to pay 84c. per 100 lb., which places these sugars at too high a parity of price compared with Canadian sugars, so that the mere question of one or two shades of colour over the 16 Dutch Standard precludes practically the same sugar by an extra duty of 43c. per 100 lb. viz :—

	B.W.I.	B.W.I.
White Granulated (Canadian) $4·20 per 100 lb.	96 deg. Crystals duty paid above 16 D.S.	Syrups 89deg. above 16 D.S.
No. 3 Yellow (highest grade) $3·33 per 100 lb.	$3·83¾	$3·46

The removal of this line of demarkation and the admitting of the sugar on the polarization test for duty would mark the advent of a much larger sugar trade for the West Indies with Canada.

SUGAR.

The market continues its upward course. The advance during April of 12c. per cwt. for 88 degrees beets for April and May shipments has enabled refiners to raise prices 10c. per 100 lb. during the last ten days. The market remains firm with a good demand. Trinidad, Demerara, Barbados and Jamaica are points from which considerable supplies have been received. The following official returns just received for February show that British Guiana continues to ship freely, supplying the place of German sugars :—

	1903.	*1904.*
British Guiana		$347,894
Germany	$309,191	4,300
B.W. Indies	35,514	69,310

MOLASSES.

Last year's stocks continue to be offered at a reduction of 2 and 3c. per gallon, which, with the reported prospective heavy crop of Barbados, retard sales of the present offerings. Small new arrivals of West Indian are however meeting ready sale in the West. Maritime provinces still report a continuance of the molasses war which seems to be a question of trade rivalry between New Brunswick and United States business interests. Barbados offerings during the first week of May at 24½c. duty paid, have not found buyers. Counter offers of 22½c. have been made by buyers, but sellers declined.

SPICES.

Business has again been quiet during April. Prices have weakened, especially in pimento and ginger.

COCOA-NUTS.

The last nine days of April and the opening week of May have seen a complete collapse of the cocoa-nut market in New York. The following which has been taken from the Trade Market Reports will be of interest to shippers :—

	Trinidad.	*Jamaica.*	*San Blas.*
April 21	$31·00	$33·00	$42·50
April 28	$21·00	$28·00	$38·00
May 9	$17·50	—	$29·00

All our recent arrivals were sold before the market gave away. We anticipate an early recovery, and we shall be glad to hear from planters or shippers who have any cocoa-nuts to offer, stating quantity and price, bags included, f.o.b. for Halifax, or c. & f. Montreal.

THE SHEEP INDUSTRY IN JAMAICA.

As briefly announced in a recent issue of the *Agricultural News*, efforts are being made to develop the sheep-breeding industry in Jamaica. At a recent meeting of the Agricultural Society it was pointed out that, as a rebate of 10*s.* duty was paid on sheep imported to supply the troops, local breeders were unable to sell their sheep. The following is the report by the Secretary, who was instructed to obtain information as to the number of fat sheep likely to be for sale :—

I beg to report that I have received the following information in reply to my inquiries relative to number of fat sheep available in the island. The response has not been very complete, and probably I have not a note of half the flocks. The Collector-General gives the number of sheep in the island at March 31, 1903, as 16,629, and the number of fat sheep available for market may be taken as one-fifth of this number.

Nearly all the letters received report that because of slow sales breeders are reducing, but that given a good market they could keep much larger flocks Many report having to sell as low as 3*d.* per lb. live weight in order to get their fat wethers and fat ewes off their hands. In St. Elizabeth even 2½*d.* per lb. is being taken. There is an entire unanimity of opinion that the requirements of the military for mutton could be supplied easily; and the St. Ann butchery report that they tendered for the military contract fully prepared to supply from local sources all the sheep that would be required.

In Trelawny, report says that the price of sheep mutton has fallen to 6*d.* per lb. in the open market, and 7½*d.* per lb. delivered at the door.

The replies received showed a total of 4,651 breeding ewes and 3,592 fat sheep available now.

At the meeting at which this report was presented it was pointed out that, as not more than 800 sheep were required each year for the troops, there was a three years' supply in the island.

It was eventually decided that representations should be made to the Colonial Secretary with a view of seeing if some arrangement could not be made with the military authorities to get the supply from the island.

MARKET REPORTS.

London,—May 24, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' May 19, 1904; and 'The Public Ledger,' May 21, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 15/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—Demerara Sheet, 2/3; Venezuelan Block, 1/7 per lb.
Bees'-wax—£7 2*s.* 6*d.* to £7 10*s.* per cwt.
Cacao—Trinidad, 58/- to 70/- per cwt.; Grenada, 52/- to 59/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 59/- per cwt.; Demerara, 64/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 38/- to 39/- per cwt.
Copra—Trinidad, sundried, £16 to £16 5*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 11*d.* per lb.
Fruit—
Grape Fruit—10/- to 11/- per case.
Oranges—No quotations.
Pine-apples—Antigua, 14/- to 16/- per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 31/6 to 60/- per cwt.
Honey—18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/11; Cake, medium, palish, 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/2 to 1/6 per gallon; Concentrated, £13 to £13 5*s.* per cask of 108 gallons.
Lime Oil—1/5 to 1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/8 to 2/- per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—110's to 100's, 9*d.* to 10*d.*; 69's to 60's, 1/8 to 2/2 per lb.
Pimento—3*d.* to 3¼*d.* per lb.
Rum—Demerara, 7½*d.* to 9½*d.* per proof gallon; Jamaica, 1/9 to 8/- per proof gallon; Leewards, 7*d.* to 11*d.* per proof gallon.
Sarsaparilla—Jamaica, 9½*d.* to 1/- per lb.
Sugar—Crystallized, 16/- to 16/6 per cwt.; Muscovado, Barbados, 13/6 to 14/- per cwt.; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£12 per ton.
Tamarinds—Antigua, 8/- to 8/6; Barbados, 10/- to 11/- per cwt.

Montreal,—May 13, 1904.—Mr. J. Russel Murray. (In bond quotations.)

Cacao—Jamaica, 12c. to 13c.; Trinidad, 13c. to 13¾c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $22·00; Trinidad, $19·50; per M. c. & f.
Coffee—Jamaica, medium, 8¼c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¼c. to 7½c. per lb. c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 24c. to 25c.; Antigua, 22c. to 24c. per Imperial gallon.
Nutmegs—Grenada, 110's, 18c. to 19c. per lb. c. & f.
Pimento—Jamaica, 7c. to 7¼c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·15 per 100 lb. c & f.
—Centrifugals, 89°, $2·02 per 100 lb. c. & f.
—Molasses, 89°, $1·78½ per 100 lb. c. & f.

New York,—May 27, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¾c. to 13¼c.; Jamaica, 10⅝c. to 12c.; Grenada, 12½c. to 12¾c.; Trinidad, 12¼c. to 13⅜c. per lb.
Cocoa-nuts—Trinidads, $20 to $21; Jamaicas, $23 to $25 per M., selected.
Coffee—Jamaica, fair to good ordinary, Black River, 7c. to 7½c. per lb.
Ginger—Jamaica, 6½c. to 8c. per lb.
Goat Skins—Jamaicas, 50c. to 55c. per lb.
Pimento—5½c. to 5¾c. per lb.
Sugar—Centrifugals, 96°, 4c.; Muscovados, 89°, 3½c.; Molasses sugars, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 1, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—13c. per gallon (Imperial).
Sugar—$1·90 per 100 lb.

Barbados,—June 4, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·25 to $3·60 per 100 lb.
Cacao—$11·00 to $11·50 per 100 lb.
Cocoa-nuts—$10·75 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $10 50 per 100 lb.
Hay—95c. to $1·05 per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $75·00 to $76·00; Sulphate of potash, $67·00.
Molasses—12c. per gallon (puncheon included).
Onions—Madeira, (bunched) $3·07 to $3·11, ex store; Bermuda, (loose) $1·51 to $2·28 per 100 lb.
Potatos, English—Nova Scotia, $2·00 to $3·25; Bermuda, $3·50 per barrel.
Rice—Ballam, $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
Sugar—in hhds., 89°, $1·75 (packages included). Dark Crystals, 96°, $2·15 to $2·20 per 100 lb.

British Guiana,—June 2, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $8·00 per barrel.
Balata—35c. to 40c. per lb.
Cacao—Native, 12c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. to 13c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—New, $4·50 to $4·70 per bag of 168 lb., ex store.
Eddoes—80c. to $1·20 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—3½c. to 4c. per lb., ex store; Teneriffe, 3c. to 3½c. per lb.
Pea Nuts—Curaçoa, 4c.; American, 5½c. per lb. (retail).
Plantains—20c. to 36c. per bunch.
Potatos, English—$4·00 to $4·25 per barrel.
Rice—Ballam, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·00 per barrel, 80c. per bag.
Tannias—$1·44 per barrel.
Yams—White, $2·04 per bag.
Sugar—Dark Crystals, $2·20 to $2·22; Yellow, $2·25 to $2·50; White, $3·00 to $3·50; Molasses, $1·70 to $2·00 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—June 1, 1904.—Messrs. Gordon, Grant & Co.; June 2, 1904, Messrs. Edgar Tripp & Co.

Cacao—Ordinary to Good Red, $12·50 to $12·60; Estates, $12·60 to $12·75; Venezuelan, $12·65 to $12·85 per fanega (110 lb.).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—65c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·60 per 100 lb.
Onions—Teneriffe, $1·75 to $2·10 per 100 lb.
Potatos, English—$2·00 to $2·25 per 100 lb.
Rice—Yellow, $4·10 to $4·40; White Table, $5·00 to $5·50 per bag.
Sugar—White Crystals, $3·25; Yellow Crystals, $2·35; Molasses Sugar, $2·15 to $2·25 per 100 lb.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 58. BARBADOS, JULY 2, 1904. PRICE 1*d*.

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Treatment of Plant Diseases.

OUR methods of dealing with plant diseases, caused by parasitic fungi, may be grouped under four heads. These are: (1) the destruction and removal of the fungi themselves; (2) the removal and destruction of diseased plants or parts of plants; (3) the avoidance of cultural conditions which favour infection and also the spread of the disease; (4) the cultivation of disease-resistant varieties of plants. We intend to deal more particularly now with the methods grouped under the first head.

It is of great importance, in the first place, that the seeds used for planting should be free from spores of parasitic fungi. This is, of course, especially important with diseases which are distributed in this way, and does not apply to soil fungi. Among cotton diseases, it is, at least, possible that both the boll rot and the anthracnose can be carried from place to place by spores attached to cotton seeds.

Two methods of avoiding the spread of disease in this manner may be mentioned. The greatest care should be taken, in selecting seed, that it does not come from diseased plants. If we do use such seed, not only do we directly spread the fungus by its spores, but also we are raising a race of plants which is specially non-resistant to the disease. Again, we can treat the seeds with some poisonous steep that will destroy any fungus spores that may be attached. This treatment of seeds has been worked out chiefly with regard to the 'smut' of wheat, oats, barley, etc., which used to cause great loss to farmers in temperate regions.

Very many substances have been used in this way. The cotton seed distributed by the Imperial Depart-

ment of Agriculture this season has all been steeped in a 1:1000 solution of mercuric chloride (corrosive sublimate), a violent poison which has been used with success against 'smut' of cereals, potato 'scab,' and other diseases. The most common steep, perhaps, is a ½-per cent. solution of copper sulphate (blue-stone): the seeds are allowed to soak in this for a night (twelve to sixteen hours); they are then taken out, drained and dried. Sometimes after treatment with copper sulphate, the seeds are steeped for a few minutes in milk of lime.

Another method of treating seeds is to steep them for fifteen minutes in hot water. This mode has been very successful, but requires careful manipulation. The temperature of the water must be kept between 130° and 134° F.; a lower temperature will not kill the spores, a higher one will injure the seeds. Formaldehyde is another steep that has been used with success.

The most important point about the application of all these methods is that they must be carried out throughout a whole district. This is a point which has been ensured this year with cotton seed.

We next come to treatment aimed at killing the fungus, or its reproductive organs, on the diseased host plant. This consists in spraying or dusting the host with some fungicide.

Powdered sulphur is used against various mildews, such as those found on grape vines and rose leaves. The sulphur may be shaken from a tin with a perforated lid or a powder gun may be used. In either case the sulphur should be applied while the leaves are wet, so that it stands a better chance of remaining attached.

Among liquid fungicides may be mentioned a solution of potassium sulphide (liver of sulphur) and a number of preparations containing copper. The most important copper preparation is the well-known Bordeaux mixture, which is a 2- to 4-per cent. solution of copper sulphate and lime; the object of the lime is to cause the copper to assume an insoluble form so that it cannot injure the foliage. Sometimes molasses or soft soap is mixed with the Bordeaux mixture to make it adhere better.

Other copper preparations used are an ammoniacal solution of copper carbonate and Eau Celeste. The former is made by mixing copper carbonate with water to a paste and dissolving the paste in just sufficient strong water of ammonia. The mixture is then diluted with sixteen times its volume of water. Eau Celeste is made by adding strong water of ammonia to a solution of copper sulphate in water.

The first use of fungicides is to kill any part of a fungus which is external to its host plant. There are a few parasitic fungi which live entirely outside their host, and only absorb nourishment by little pegs which grow into the outermost cells of the plant. These fungi can be killed out entirely by the proper fungicidal treatment.

Most parasitic fungi, however, are endophytic, that is, the mycelium (or vegetative part) is inside the body of the host. Their reproductive branches bearing the spores are often produced on the surface. The object of spraying is to get at and kill these reproductive organs, and thereby prevent their spread to other, still healthy, plants.

The other main object of fungicides is to kill any spores of the fungus which may light on a leaf that has been sprayed. In both cases the spraying is rather a preventive, than a curative, treatment.

It is perfectly obvious, therefore, that, to be effective, spraying must be done early, while only a few plants are affected.

Leaf and fruit diseases are the ones which are most usually treated with fungicides; root diseases, caused by soil fungi, cannot be reached by them, and it is seldom that a stem disease can be effectually dealt with by spraying. Moreover, in the case of fruit diseases, spraying must be stopped some time before the fruits are ripe.

Other methods of destroying the fungi themselves, such as removing the large toadstools, which are the spore-bearing organs of wood-destroying fungi, the removal and destruction of diseased plants and parts of plants, have often been insisted upon in the *Agricultural News* and in other publications of the Imperial Department of Agriculture and need not be dealt with at length here, though they are of the utmost importance.

The method of preparation of the fungicides mentioned is given in Pamphlet No. 17, 'The General Treatment of Fungoid Pests' and on p. 214 of this issue.

Ylang-Ylang Sachet. Powdered orris root, 3 lb.; ground cassie flowers, 1 lb.; rose petals, 1 lb.; pimentos, 4 oz.; ground Tonka beans, 2 oz.; ground vanilla, 2 oz.; ground benzoin, 1 oz.; essence of musk, 1 oz.; essence of civet, ½ oz.; oil of bergamot, 2 drachms; oil of ylang-ylang, 2 drachms; oil of pimento, 1 drachm; oil of rose geranium, 1 drachm; otto of rose, 20 minims. (*Pharmaceutical Journal*, May 28.)

SUGAR INDUSTRY.

Experiments in Jamaica.

We take the following note, with respect to the sugar industry in Jamaica, from the *Gleaner* of June 13:—

We are in a position to place before our readers to-day details of the scheme for utilizing the £10,000 grant-in-aid of our sugar industry, which was made by the Imperial Parliament some three years ago. This scheme is to be explained to the sugar planters of St. James and Trelawny on the 20th. inst. by the Acting Governor.

Eight acres of land, forming part of the property on which Hope Gardens is situated, are to be planted out in seedling canes grown in Jamaica and imported from Barbados and Demerara. At least 2,000 of these will be planted, and from this nursery seedling canes will be distributed to the several sugar estates. The Government sugar expert will be in charge of the nursery, under the direction of Mr. H. H. Cousins.

The present laboratory building is to be doubled. The upper floor will then be converted into an efficient and well-equipped sugar laboratory which will have a staff of at least three workers. This sugar laboratory will be fitted out with special instruments and labour-saving devices to ensure accuracy and speed in the experiments and analyses to be made. Free analysis of one sample of sugar and one sample of cane juice for any sugar estate will be made during crop times.

In addition to this, a study of sugar and sugar products will be made in the several boiling houses of the island by members of the staff of the laboratory.

The lower floor of the enlarged building will be immediately in charge of the Fermentation Chemist.

Experiments in distillery will be made, a study of yeast and bacteria undertaken, and in general a detailed study of the chemistry of Jamaica rum.

It is hoped that certain properties will be discovered in our rum, by these means, whereby fraudulent sale of other liquors under the name of 'Jamaica Rum' will be prevented and the prosecution of the sellers rendered easy.

Rum manufacture will also be studied in all its branches on a small scale. The apparatus will consist of a small boiler and engine, a refrigerating plant, a large number of fermenting vessels of 100 gallons capacity, and a small experimental still of 50 gallons capacity, completely adaptable in dimensions, in height of head, retorts and condensing. There will also be a rum store for the storage of rum samples. These samples will be obtained from the several estates in the island and will be experimented on for the purposes of discovering means whereby their quality may be improved. In addition, samples of estate skimmings, molasses and dunder skimming will be obtained from each estate and separately experimented on, rum being manufactured from them.

Experiments in improved manufacture will also be carried out on some sugar estates.

The cost of enlarging the laboratory is estimated at £1,000. The machinery will cost £1,000.

Another £1,000 will be devoted to the installation or modification of distillery plants on sugar estates.

The cost of running the department will amount to about £1,400 a year.

£100 a year is to be devoted to providing ten scholarships, at £10 each, for the purpose of enabling distillers and estate book-keepers to come to the Laboratory for a three-weeks' course in the scientific handling of apparatus, etc.

It is estimated that the £10,000 grant will run this department for a period of six years.

A small committee will advise Mr. H. H. Cousins, who will be the officer-in-charge of the department.

Briefly, this is the scheme which is soon to be explained more fully.

Experiments with Ratoons.

The following note on experiments in sugar-cane cultivation, at the Botanic Gardens, Georgetown, is taken from the Demerara *Daily Chronicle* of June 15:—

In the Brickdam field, the most striking feature is the large number of thriving fourth ratoons. Of these D. 625 is the best from every point of view, though others which run it close for excellence are D. 125, D. 109, and D. 1,896. Another seedling, D. 2,468, has shown signs of improvement with each ratooning, and the fourth ratoons are a marked advance on the first seedlings. Regarding B. 147, the fourth ratoons show a falling off, there being wide blank patches here and there in the beds, revealing that the seedling is dying out on the fourth ratooning. D. 1,640 has died out entirely, and all further experiments with it will be abandoned. The general growth of the fourth ratoons is in itself a strong indication of the usefulness of the seedling cane experiments, illustrating, as it does, the quality and virility of the canes in question, and encouraging the expectation that the Bourbon cane cultivation of British Guiana may eventually be supplemented, on a scale large enough to yield substantial profitable returns, with seedling canes of proved superiority.

ANSWERS TO QUERIES.

The Moon Flower.

In reply to our question as to the occurrence of the Moon Flower, in a wild or cultivated state, in the West Indies (*Agricultural News*, Vol. III, p. 181), Mr. A. J. Jordan informs us that the Moon Flower (*Ipomoea Bona-Nox*) was seen growing in several of the peasants' gardens last year, but has not been observed in a wild state in Montserrat.

The Cho-cho as a Bee plant.

With regard to our query in a previous issue of the *Agricultural News* (Vol. III, p. 155), Mr. A. J. Jordan, the Curator of the Botanic Station, Montserrat, informs us that it has often been observed that bees are very fond of the flowers of the cho-cho or christophine (*Sechium edule*), while another plant that the bees there are very fond of is *Euterpe edulis*.

Crotons.

Referring to the inquiry of a correspondent which appeared in a previous number of the *Agricultural News* (Vol III, p. 139) concerning plants of the croton 'Princess of Wales,' Mr. J. H. Hart, Superintendent of the Botanical Department, Trinidad, furnishes the following information:—

'*In re* "Princess of Wales croton." Price here 50c. each. Packing 1*s.*, cartage shipping 1*s.* 1*d.*, = $1·50 for two plants.'

WEST INDIAN FRUIT.

GATHERING FRUIT FOR MARKET.

The following notes are taken from an article by Messrs. W. Cradwick, W. Harris and T. J. Harris, in the *Bulletin of the Department of Agriculture*, Jamaica, for May 1904:—

Pine-apples.—In gathering ripe pine-apples do not cut the stems, but break off each close up to the base of the fruit.

Do not leave the fruits lying in the sun after gathering, but remove them at once to a dry, shady place.

When carrying the fruits to market keep them dry, shade from the sun and be careful not to bruise them in any way.

Do not trim or cut off the crowns: these add to the appearance of the fruits.

Bananas.—In cutting down bananas, do not fell the trees, so that bunches fall on the ground with a crash and get bruised and soiled with earth: cut the stem partly through high up, so that the bunch will come down gently, and can be caught with the hands.

Wrap each bunch carefully in soft trash and handle with great care in carrying them to the dépôt.

Keep them dry, and shade from the sun as much as possible.

Unbruised, ripe bananas are worth four times as much when they get to England or America as the bruised ones. A small bruise does not show when the bunch is green, but when the fingers ripen, the bruised parts turn black and rot.

Grapes.—Bunches of grapes should be well thinned while the grapes are quite small, about the size of a Gungo [or Pigeon] pea. A bunch of properly thinned grapes weighs more than an unthinned bunch, and the berries are bigger, finer looking and much sweeter. Unless they are thinned they cannot ripen properly.

Before cutting a bunch of grapes be sure that it is quite ripe. Bunches containing a great many green or half-ripe berries are of little value.

Line the basket or tray with plenty of nice fresh leaves from the grape vine and lay the bunches carefully on these.

Do not put too many bunches in the basket or tray or they will squeeze each other and spoil the berries, and never put one bunch on the top of another.

When carriyng to market cover the bunches with fine muslin to keep off the dust. Grapes should never be handled except by the stem, and then as little as possible, and with very great care.

Citrus.—Oranges and grape fruits should never be shaken off the trees, but should always be stem-cut and gathered by hand, the fruits being placed in padded baskets as they are gathered. All bruised fruits, or those that are injured by prickles, should be rejected.

The fruits when gathered should be removed at once to a cool, airy place, and kept quite dry. In sending to market or to the fruit dépôt take every possible care not to expose the fruits to sun or rain, and handle them more carefully than eggs, always remembering that one bruised fruit will spoil many others.

Mangos.—Do not shake mangos off the trees, for in falling to the ground they get bruised, which causes rot to set in, and bruised fruits of any kind are not good. Gather by hand and place gently in baskets.

If the fruits are for export they should be stem-cut like oranges. Do not expose to the rain, sun or dust.

Naseberries.—Naseberries [or sapodillas] should be gathered singly by hand, and carefully placed in a bag which the gatherer may take up the tree with him.

When the bag is filled it should not be dropped to the ground, but should be lowered carefully by means of a stout cord or a rope to avoid brusing the fruits contained in it.

Although naseberries are quite hard when gathered, any injury that they receive is plainly seen when they ripen a few days later.

Akees.—Akees should be gathered just when they begin to open. Never gather or eat green, unripe or stale akees, nor allow any one to eat them, as they are then poisonous. Never pick akees from a branch that has been broken or twisted; forced-ripe akees are also poisonous.

Avocado Pears.—Pears should be gathered and handled with great care. Any scratch or bruise will cause a pear to rot and it is then not fit for food.

The person who gathers pears should go up the tree with a bag or basket in which he should gently place each fruit as picked, and when he has gathered enough, his bag or basket should be slowly lowered to the ground by means of a rope.

Pears are often much bruised by their own seed if carelessly shaken.

Horse Nicker Seeds. These are the seeds of *Caesalpinia Bonducella*, a leguminous tree of common occurrence throughout the West Indies. The dry, orange-brown pods are covered with spines; the seeds are lead-coloured and beautifully polished. The specific name, *Bonducella*, is, according to the *Treasury of Botany*, derived from the Arabic *Bondog*, signifying a necklace, as the seeds are frequently used for necklaces, rosaries, etc. The oil expressed from the seeds and the seeds themselves are put to various uses in medicine.

COTTON NOTES.

Cotton Cultivation in Montserrat.

The following review of the past season in Montserrat, with regard to cotton growing, has been prepared by Mr. A. J. Jordan, the Curator:—

It is now possible to review with certainty the past season's experience, as the whole of the crop has been gathered and, with the exception of a few hundred pounds, ginned. Forty-six thousand pounds of lint have already been marketed, and the price obtained for this has ranged between 10*d.* and 1*s.* 2*d.* per lb. There are 4,000 lb. more lint to be shipped, making a total for last season's crop of 50,000 lb. Three hundred and thirty-four bags of cotton seed have also been shipped.

The estate which did best was Trants where, taking advantage of the wet weather in May, when there was a rainfall of 6·42 inches, the seeds were sown in that month. Although 15 acres gave no returns, owing to the land being exposed to the sea winds, the total amount of lint obtained was 14,000 lb.

No cotton planted late did well. The planting extended from May to November and the returns show that the later the seeds were sown the smaller was the yield, thus confirming the experience of the two previous years.

It is estimated that the leaf-blister mite did damage to the amount of £2,000, and that the so-called 'black boll' is responsible for a further loss of some £3,000 sterling.

It has been demonstrated that the leaf-blister mite can be kept in check by the application of sulphur and lime.

Two thousand, eight hundred and thirty pounds of the improved variety of cotton seed imported by the Imperial Department of Agriculture have already been distributed this year. Another thousand pounds is required but cannot be obtained, owing to the delay in orders reaching the Department. Five sowings of this seed have been made in boxes. The highest returns gave 95 per cent. of plants, the lowest 68 per cent.; the mean was 81·8 per cent. The seeds had been disinfected.

Experiments in St. Kitt's-Nevis.

Mr. F. R. Shepherd, Acting Curator of the Botanic Station at St. Kitt's, has forwarded the following note on the experimental cultivation of cotton at Conaree estate, kindly prepared by the manager:—

You asked me sometime ago to reckon the cotton trees on the small patch you examined and to let you know the quantity with a few remarks, which I now do.

Number of cotton trees, 3,109; planted October 23, 1903, on the centres of land prepared for cane on every other row, that is, 10 feet by 4 feet.

The entire field was fairly manured under the banks with pen manure mixed with sea weed; no extra attention was paid to the spot used for cotton.

Seed-cotton reaped to date from same patch, 2,494 lb. I am quite sure it will give 600 lb. more.

I have just commenced to pull up all trees on which there are no fully developed bolls, as I cannot wait for those now appearing.

While growing the trees were not attacked by the cotton worm and appeared quite healthy until within the last two weeks, when a few have been attacked by the leaf-blister mite: these I am pulling up and burning.

What I was particularly struck with was that all the bolls on the trees came to maturity, none dropping.

I counted the bolls on several trees, over 200 on each, one had on 287, and another 263.

Some of the trees still have on 100 bolls. The cane plants were planted at the end of November.

We regret that an unfortunate error occurred in the report of the results of the cotton experiments at Nevis, published on p. 149 of this volume.

The actual area of each of the plots (A,B,C,D) is $\frac{1}{15}$ acre, the total area is, therefore, $\frac{4}{15}$ acre, and not $\frac{1}{15}$ acre as stated. The total yield from the four plots should be recorded as at the rate of 475 lb. of seed-cotton per acre.

St. Lucia.

The following notice, signed by Mr. J. C. Moore, Agricultural Superintendent, appeared in the St. Lucia *Official Gazette* of June 4:—

The Imperial Department of Agriculture for the West Indies has placed at the Agricultural School, Union, a Single-acting Hand-power Macarthy Cotton Gin, received from the British Cotton Growing Association.

Cotton growers are invited to call and see the gin, and bring samples of Sea Island cotton for trial.

Growers of small lots of Sea Island cotton in the Gros-Islet District who experience difficulty in getting their cotton ginned, and desire to obtain the temporary use of this machine, should apply to the Agricultural Superintendent at Union who will explain the conditions under which permission may be granted for the free use of the gin.

Cotton Seed Cake and Meal.

Attention has often been drawn in the *Agricultural News* to the feeding value of cotton seeds. The following note on this subject is taken from Snyder's *Chemistry of Plant and Animal Life*:—

Cotton seed cake and meal are concentrated nitrogenous foods and are obtained from cotton seed after the removal of hulls and the extraction of the oil. The meal is lemon-yellow in colour and is characteristically rich in crude protein and ether extract. It contains somewhat more crude protein than linseed meal. Cotton seed meal is a concentrated nitrogenous food and can be fed, when properly combined with other foods, to sheep and beef and dairy animals. It cannot safely be fed in large amounts, nor for a long period, to swine. When used in a dairy ration as the principal food, it influences the character of the butter-fat, producing butter with a high melting-point.

Utilizing Lawn Mowings. Some years ago I was driven into a corner for the want of stable litter or ordinary farmyard manure. Having an enormous quantity of short grass, which gave us some trouble because of its offensive smell when laid into heaps, and the difficulty of disposing of it, it occurred to me that this grass might be used for feeding cattle, and to this end a small shed having a yard surrounding it was prepared, and by way of experiment a couple of young beasts were installed in it. The grass was carted from the lawn and tipped into this yard; the beasts ate what they required, the rest was trampled down, and there being always plenty of tree leaves to be had, a few loads were now and then carted in and tipped over the grass, which made the manure all the better. The cattle throve amazingly. (*Gardeners' Chronicle*, May 21, 1904.)

POULTRY.

Change of Ground.

The following article, on an important point in the rearing of poultry, is taken from the *Farmer and Stockbreeder* of May 30:—

Change the ground frequently. This is the secret of success, not only with regard to adult poultry, but particularly so with regard to the raising of chickens. A second brood of chickens should never be put on to ground which has been previously used for an earlier brood. All chicken pens and runs should be of a movable type, and they should be transferred daily to fresh ground. It is very little trouble, and it counts for a great deal, because insanitation has more to do with the death of chickens by dysentery and other troubles than anything else. Besides this, constant moving of pens in this way ensures the whole of the ground being kept sweet; none of it becomes so contaminated that it has to be left a whole season before it can be renewed. It is good for the ground, for after chickens have been off the ground for a day or two the grass will grow strongly, and can then be cut, and in a week or two that ground will be as sweet and wholesome as if chickens had never been upon it. Let them remain month after month, however, and the ground becomes so saturated and contaminated that it needs a whole season to get it clean again. Then, again, removal to fresh ground means that the chickens will always have a supply of wholesome, sweet green-stuff.

Adult poultry also need frequent change of ground, and if it is not possible to transfer them on to fresh ground, then the ground they occupy should be dug over from time to time to the depth of at least a foot, and there should always be an empty pen, so that one of the pens can always be available for change. Before the ground of a pen is dug over, a little slaked lime and a little salt may with advantage be sprinkled all over it. Let this be exposed to the weather for a day or two, and if a good downpour of rain comes on it, so much the better. Then dig it in, as already stated, to the depth of a foot, and the ground will be thoroughly well disinfected and wholesome if it is left fallow for a week or two, after which the poultry can come back to it. The rotary system of having, say, half a dozen poultry pens, only four or five of which are occupied, is a safeguard, and usually ensures immunity from outbreaks of disease, if the other conditions—roosting, feeding, etc.—are as they should be.

Lice in the House.

The following note dealing with lice in poultry is taken from the *Agricultural World* of May 28:—

The small chicken lice are difficult to get at so effectively as to rid a house of them after they have once settled in it, for they live in the earth floor, and in the cracks of the walls and roof. To get at them effectively, burn sulphur in the house when it is empty and fumigate it thoroughly. A good way is to take an iron pail, half fill it with sand or ashes, put a few coals and wood on it, in a sort of basin scooped out, and an ounce or two of sulphur on the coals. Let this burn in the closed house, so that fumes of the sulphur will enter every crack, especially in the ceiling, where the mites, which so annoy the fowls at night, harbour mostly, and keep the sulphur burning for an hour. Then thoroughly saturate the perches with kerosene, and paint well the nest boxes especially in the crevices. Do this at least every two months, and the fowls will be free from annoyance and attend to business much better in every way.

FUNGICIDES.

The following is an account of the preparation of the fungicides mentioned on p. 210:—

BORDEAUX MIXTURE.

Copper sulphate (blue-stone)	6 lb.
Unslaked lime	4 lb.
Water	50 gallons.

The 6 lb. of copper sulphate (blue-stone) are dissolved in 25 gallons of water in a *wooden* tub or barrel. It is best to tie the crystals of blue-stone in a piece of sacking and suspend it in the water from a stick laid across the top of the barrel. At the same time 4 lb of *freshly-burnt*, unslaked lime are slowly slaked, and the resulting paste made up to 25 gallons with water, and well stirred. Next, the lime wash and the solution of blue-stone are slowly poured together into a third tub or barrel holding from 50 to 60 gallons. When the mixing is complete, the blue liquid is stirred for a minute and tested by placing therein a clean, bright knife-blade for one minute. If the knife-blade remains bright, the Bordeaux mixture is safe, but if it becomes covered with a deposit of copper, more lime milk must be added until this deposit ceases to form. Prepared in this way, the blue substance in the mixture does not settle readily and the mixture does not require much stirring before use.

AMMONIACAL SOLUTION OF COPPER CARBONATE.

Water	45 gallons.
Strong water of ammonia	3 pints.
Copper carbonate	5 oz.

The copper carbonate is made into a thin paste by adding a pint and a half of water. The ammonia water is then slowly added and a deep blue solution is obtained which is made up with water to 45 gallons.

EAU CELESTE.

Dissolve 2 lb. of copper sulphate in about 8 gallons of water; when completely dissolved add 3 pints of strong aqua ammonia and dilute to 45 gallons. This may be used in a modified form.

LIVER OF SULPHUR.

Water	$2\frac{1}{2}$ gallons.
Potassium sulphide	1 oz.

Dissolve the potassium sulphide, popularly known as liver of sulphur, in a quart of hot water, then make up to $2\frac{1}{2}$ gallons with cold water. This is also a clear liquid, and can be easily used without any clogging at the nozzle of the sprayer. It is useful for checking the spread of an epidemic.

ARBOR DAY.

Grenada.

The following notice, signed by Mr. W. E. Broadway, Curator of the Botanic Station, appeared in the Grenada *Official Gazette* of June 15. It may be noted that June 24 is the Official Arbor Day in that island:—

Applications for the free distribution of plants from the Botanic Station for planting on Arbor Day will be received by the Curator. Not more than *two* plants will be issued to each applicant. 'Plants' for this occasion comprise timber, fruit, shade and ornamental trees, and not such as ferns, Begonias, roses, etc.

SCIENCE NOTES.

Galba.

This useful forest tree, known botanically as *Calophyllum Calaba*, is a native of the West Indies and tropical America. Although of considerable importance as a timber tree, its wood being much used for building purposes and for making furniture, it is more particularly to be recommended for planting as a wind-break. It is a lofty tree, sometimes attaining a height of over 100 feet, with a straight trunk and dense top. Its seeds contain an oil which is expressed and used for burning. As this is about the time for galba to form its fruit, we would urge planters to save its seeds for planting. Large numbers of seeds are being sown at some of the Botanic Stations, but it is impossible to raise, in these limited areas, as many seedlings as it is desirable should be planted out.

It is hoped that the efforts of the Department to encourage the planting of wind-breaks in exposed situations will receive the practical support of planters.

Leaf Structure and Environment.

A recent issue of the *Journal of the Linnean Society* contains an interesting paper by Mr. L. A. Boodle, F.L.S., on 'The Structure of the leaves of the Bracken (*Pteris aquilina*, Linn.) in relation to Environment.'

The bracken, as the author points out, is a fern which grows in very diverse habitats, for instance, on dry heath land, and also in damp and shaded woods. It has long been known that the external features of the plant vary according to its habitat; deep shade and shelter from wind bring about a more foliose and spreading habit, while exposure tends to a harder and dwarf habit; there are also differences in leaf-colour, hairiness, etc.

On examining the structure of leaves from different situations, Mr. Boodle found striking anatomical differences, which he gives as follows:—

'In the exposed leaf, as compared with the sheltered one, the outer wall of the upper epidermis is considerably thicker, there is a well-differentiated hypoderm, the thickness of the leaf is considerably greater, the palisade tissue usually occupies a distinctly greater proportion of the mesophyll, and its cells are more elongated, while the spongy tissue usually appears less lacunar. In the sheltered leaf there is practically no hypoderm, while a certain number of epidermal cells may contain chlorophyll; there may also be no differentiated palisade.'

As the author points out, the presence of a distinct hypoderm (a layer of colourless cells immediately below the upper epidermis) in some cases and practically none in others is an example of a wide range of structure.

One case in which different parts of the same leaf showed these different characters is of great interest: a leaf about 6 feet high had grown up through a dense bush. The lower part of this leaf showed the structure of a sheltered leaf as described; the uppermost leaflets had over topped the bush, and these showed all the characters of an exposed leaf. This proves that the mature structure of the leaf is not determined up to a very late stage of its growth.

The author also discusses the different factors which may determine the leaf-structure and comes to the conclusion that light is not the 'all-important character determining the structure of sun leaves and shade leaves.' Dryness of air, exposure to wind, dryness or coldness of soil usually accompany strong light in exposed situations, and any one of these may be a determining factor, at least in part.

The Purification of Water Supplies.

It frequently happens that small ponds and other reservoirs of water become filled up and spoiled by the growth of a green slime caused by the development of a variety of algae. This slime often gives to the water a distinctly objectionable taste and odour. So important was this matter considered in the United States that special investigation was made, by Mersrs. Moore and Kellerman, of the Bureau of Plant Industry (U.S. Department of Agriculture), into methods of destroying the growth. Their results have been published in *Bulletin* No. 64 of the Bureau.

It was found that a very dilute solution of blue-stone (copper sulphate) was sufficiently toxic to destroy the algae or to prevent their appearance. The solution was so dilute as to be colourless, tasteless, and harmless to man.

The method of applying the copper sulphate is to put the required amount of the salt into a coarse bag, attach this to the stern of a row boat, near the surface of the water, and then row slowly backwards and forwards over the water.

The method can be applied to all kind of reservoirs, pleasure ponds, water cress beds, etc.

It is suggested that copper sulphate can be used in this way to destroy mosquito larvae and also to destroy the germs of cholera and typhoid in drinking water.

RICE CULTIVATION IN BRITISH GUIANA.

The following notes on experiments with different varieties of rice at the Botanic Gardens, is taken from the Demerara *Daily Chronicle* of June 15:—

A considerable area of land which has been reclaimed from bush at the north-east corner of the Gardens is planted with rice, and the soil has turned out more satisfactory than was at first anticipated. This land was planted with some fourteen varieties of rice, presented by the Government Secretary (the Hon. A. M. Ashmore, C.M.G.), 20 square roods being allotted to each variety. A preliminary crop was taken off but not tested. The second crop is now growing, and promises remarkably well. With irrigation almost as perfect as could be desired and all other conditions favourable, the cultivation presents a model which the farmers would do well to imitate. It is interesting to note that at the Gardens the creole rice is much behindhand as compared with the introduced varieties and, moreover, takes considerably longer to mature.

In other parts of the experimental fields the rice cultivation is being extended. Since last year, the whole acreage of the fields has been enclosed with a new barbed wire fence, which has been set back so as to include within its boundary the trenches which were outside the old fence. These trenches will in all probability be utilized for rice growing in the same way as that running parallel to the vinery has been. Here what is known as hill rice has been most successfully grown and reaped just four months after planting. Experts say that they have seldom, if ever, seen hill rice give such an excellent yield, in such circumstances, the particular variety not usually being cultivated under the conditions which prevail there. The seed will probably be distributed between various Government institutions in other parts of the colony with the object of further testing its suitability under varying conditions for cultivation here.

In every sense the experiments with rice may be deemed highly satisfactory, and every facility will be afforded the rice cultivators throughout the colony to obtain seed of the new varieties which have shown themselves superior in growth to the creole rice.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 223 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, JULY 2, 1904. No. 58.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue, dealing with the treatment of plant diseases, discusses the various methods of destroying and removing parasitic fungi. To avoid spreading diseases, seed for planting should be selected from healthy plants, and seeds should be disinfected before being planted. Next, fungi can be destroyed on growing plants by dusting or spraying with fungicides. Directions for preparing the fungicides will be found on p. 214.

Details are given on p. 211 of an important scheme that it is proposed to bring into operation in Jamaica for the improvement of the sugar industry. Extensive experiments in sugar-cane cultivation and rum manufacture are to be carried out.

We have constantly emphasized in these columns the necessity for care in handling fruit: the detailed instructions given on p. 212 deserve close consideration by fruit growers.

Our cotton notes include interesting information relative to the cultivation of cotton in Montserrat and in St. Kitt's-Nevis.

Extracts from a report by the Entomologist dealing with thrips on cacao at Grenada and a note on trapping cotton stainers will be found on p. 218.

Mr. Russell Murray, the Department's correspondent in Canada, reports on the position of West Indian produce in the Canadian markets, and makes suggestions as to openings for trade, which should be useful to our readers.

The Birds of St. Vincent.

The Jamaica *Leader* of June 10 draws attention to the account given in the recent issue of the *West Indian Bulletin* (Vol. V, p. 75) of the birds of St. Vincent. After calling attention to the value of this paper, as a basis for the work of future naturalists, the writer tries to identify some of the birds with some of those in Jamaica. He says that the mocking bird, tick bird, ground dove, white gaulding, frigate bird and pelican of the two islands are probably the same. The chicken hawk, he says, is much like the red-tailed buzzard of Jamaica, while the Soufrière bird is similar, or closely allied, to the solitaire.

The Soufrière bird is probably peculiar to St. Vincent, but the tick bird, ground dove, white gaulding, frigate bird and pelican are recorded for Jamaica.

Lectures on Cotton in Barbados.

The first of the series of lectures to peasant proprietors and others, in Barbados, was given on Wednesday, June 29, at 7.30 p.m. By the kind permission of the Governing Body, this lecture was held at the Trinity Schoolroom, St. Philip. As already announced in the *Agricultural News*, the lecture was illustrated by lantern slides.

The lecturers in this instance were Mr. J. R. Bovell, F.L.S., F.C.S., who dealt with the cultivation of cotton; Mr. L. Lewton-Brain, B.A., F.L.S., who dealt with fungoid diseases, and Mr. H. A. Ballou, B.Sc., who dealt with insect pests. A number of copies of Pamphlet No. 31, 'The A.B.C. of Cotton Planting,' were distributed in connexion with this lecture.

The lecture was well attended and the audience were evidently interested in the subject.

The next lecture in Barbados will be given on Wednesday, July 6, at the Parry School, St. Lucy.

Cotton in Haiti.

An article, by M. M. E. Fossat in the issue of the *Journal d' Agriculture Tropicale* of April 30, gives an account of Haitian cotton and its cultivation. From 10,000 to 12,000 bales, each of 210 to 220 kilograms (460-480 lb.), are exported annually. The cotton is similar to that exported from Brazil.

The cotton is obtained from shrubby, perennial plants (probably resembling the native Barbados cotton) and no replanting or cultivation is done. The author considers that this is one cause of the deterioration of Haitian cotton and recommends intelligent and well-regulated cultivation.

The method of gathering cotton is lazy in the extreme; the cultivator fixes up a cloth to leeward of the plants and then waits until the wind tears the cotton from the bolls and blows it up to the cloth. The cotton, of course, becomes mixed with dirt of all kinds, and, by exposure to the weather, loses its gloss and becomes stained. If the cotton were carefully gathered, the author considers that 100 to 110 francs could be obtained per 50 kilos., instead of 85 francs which is the present price (17 to 20c. in place of 14c. per lb.).

The Agricultural Schools.

We hope to publish, shortly, in the *Agricultural News*, extracts from one of the ledgers kept by the boys at the Agricultural Schools. The present ledger was obtained for this purpose from the school at Dominica.

The ledgers contain an account of the practical work carried out by the boys in the School Gardens and Experiment Plots. They are entered, from time to time, as land is prepared, seed sown, manuring or weeding carried out, crop gathered, etc. They thus contain, finally, a complete record of each experiment as carried out by the boys themselves. For instance, under Yam, Plot No. 1, we get the area of the plot and the previous crop entered, then follow the preparation of the land, the preparation of plants, planting, after cultivation (with dates), and the reaping with the results of each variety tried.

St. Vincent Arrowroot.

The *Grocers' Monthly* for March 1904, discussing the present low range of prices for arrowroot in the London markets, advocates judicious advertising as a means of counteracting the falling off in the demand. In conclusion, the following suggestion is made regarding St. Vincent arrowroot:—

'Our suggestion would be: Buy one or two of the best St. Vincent brands of arrowroot and retail them at popular prices. The advertisements might work out at 1*d.* per lb., and should include, as we have already said, special recipe books for distribution, as well as newspaper notices and posters. A few smart cooking experts, sent to canvas and demonstrate to the chief buying centres by means of classes and lectures, at which housewives and daughters could taste the delicacies as well as see them prepared, would also be as well. If something of this sort were done, we cannot help thinking that all concerned would be greatly benefited, that is, the planter in St. Vincent, the packing house over here, the retail grocer handling the food, and last, but by no means least, the consumer, wide-awake at last to the many advantages of a food that has been, up to now, far too much neglected.'

East Africa and Agriculture.

We welcome the appearance of a new periodical dealing with tropical agriculture in the *East Africa Quarterly*, the first issue of which has just appeared. This journal deals with agriculture, commerce, geography and other interesting matters concerning East Africa and Uganda, and is published quarterly under the authority of the East Africa Agricultural and Horticultural Society. The present issue contains a short but interesting article on the agricultural prospects of East Africa. The soil, climate and other conditions of the highlands are said to place the country in a position of exceptional advantage from an agricultural point of view, and there seems to be no reason why it should not go ahead and flourish, so soon as the questions of the products best suited to be grown, and the best and nearest market for such produce shall have been determined. 'What is really wanted are economic products having a practically standard value and for which there is almost an unlimited demand.'

Several products of economic importance—fibres and oil-producing plants, rubber and coffee—are mentioned, but cotton takes first rank. Small quantities of cotton have already been grown, and it is believed that its successful cultivation will, in itself, ensure commercial prosperity to the country. The plains lying between the Kikuyu country and the Athi river, and a great deal of land lying between Nairobi and the coast, as well as the country lying between Fort Ternan and Lake Victoria are mentioned as suitable for cotton cultivation.

Fodder Plants in Cocoa-nut Plantations.

A report on Samoan agriculture by Dr. F. Wohltmann has recently been published under the title of *Pflanzung und Siedlung auf Samoa* by the Kolonial Wirtschaftliches Komittee zu Berlin.

Cocoa-nut cultivation receives a large share of the author's attention, and in this connexion interesting information is given as to the mode of treating the soil in the plantations.

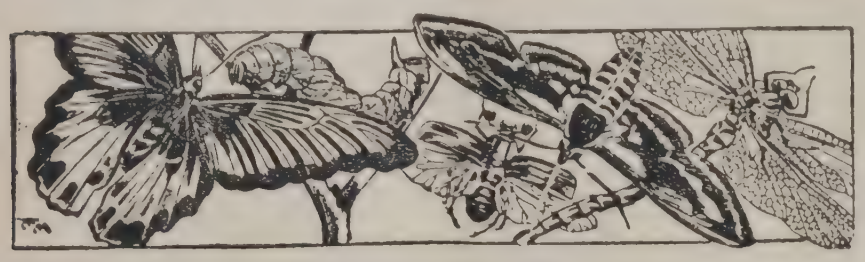
As an inexpensive method of keeping the land free of bush and weeds, stock were obtained from New Zealand and Australia and pastured on the plains. Later, various pasture plants, such as the buffalo grass of North America, *Lepturus* (Monerma) *repens*, and the shame weed or sensitive plant (*Mimosa pudica*), were planted.

The buffalo grass was found to rob the palms not only of plant food, but also—and this was even more serious—of moisture. In these respects the shame weed was more satisfactory: being a leguminous plant it is able to obtain nitrogen from the air and so enriches the soil and helps to feed the palms. Moreover, on account of its peculiar property of closing its sensitive leaves on the fall of rain or the deposit of dew, moisture is allowed free access to the palm roots.

The great drawback to the use of the shame weed, however, is that stock leave uneaten the hard parts of the plant. These, with the spines, cause much inconvenience to the bare-legged and bare-footed negroes who are sent in to gather the fallen nuts. In consequence, it becomes necessary to incur additional expenditure of time and money in keeping the shame weed cut low.

An interesting comparison is given of the relative feeding values of these and other pasture plants. It is shown that *Mimosa pudica* is by far the richest in nitrogen and consequently the most nutritious. It was found to contain 20 per cent. of protein, while buffalo grass contained only 4·25 per cent.

Dr. Wohltmann considers that if it were not that this plant grew so very luxuriantly and formed spines, it would be most suitable for cultivation in cocoa-nut plantations. The production by breeding of a spineless variety of the shame weed is suggested.



INSECT NOTES.

Grenada.

The following is extracted from the report by Mr. H. A. Ballou, B.Sc., on his recent visit to Grenada. This extract deals with the thrips on cacao:—

Thrips of cacao (*Physopus rubrocinctus*) has been known in Grenada since 1898, when it attracted the attention of the cacao planters, and specimens were sent to the British Museum for identification. Since that time, there have been several outbreaks of this pest in Grenada and it has also appeared in other islands.

The following is a list of the published references to 'Thrips' on cacao in Grenada, most of which also contain recommendations as to the treatment of the disease or the use of spraying apparatus for applying insecticides:— (1) *West Indian Bulletin*, Vol. II, pp. 176, 181 & 288. (2) *Agricultural News*, Vol. II, pp. 56, 66, 88, & 134; Vol. III, p. 10. (3) Grenada *Official Gazette*, 1898, pp. 121, 198 & 229; 1900, February 16; 1901, April 15.

I visited Hope estate where the cacao was reported to be badly attacked by thrips. I found that the latest serious attack occurred in November and December 1903. In one field of about 2 acres the trees were entirely dead, and I was informed that this was due to the attack of thrips. In other fields many trees were dead and others had dead twigs and branches on them, and no cause could be seen, but I was told that they had been seriously attacked by thrips. Not many thrips were to be seen in any field at the time of my visit, but a few were present in several different places, and trees were plainly suffering from some cause which I could not find, but I was assured that they had been seriously attacked by thrips during the last general outbreak.

At the Botanic Gardens I saw thrips on the leaves and pods of cacao, but not in sufficient numbers to do serious damage. In driving from Sautuers to Hope estate I saw by the roadside many fields in which the trees showed the leafless, apparently dead, twigs which are said to be the result of the thrips attack.

Upon several estates spraying has been employed; rosin wash, rosin compound, whale oil soap and kerosene emulsion have all been tried, and fumigating has also been practised as well. Fumigating is done by means of small bush fires on which sulphur is sprinkled. The amount of sulphur used is some 5 or 6 lb. per acre. It is impossible that this could have any effect in killing thrips, and is probably merely time and money wasted. Any sulphur fumes strong enough to kill thrips in an orchard would probably seriously injure the leaves and would certainly render the atmosphere absolutely unfit to breathe, so that the labourers would be unable to remain in the vicinity of the fires. No experimental spraying has been carried out, so that it is impossible to say how much good has been done by the use of any of the washes tried. The spraying was done with different washes in different places and no exact comparison can be made between the different kinds of treatment.

I am of opinion that the matter of first importance in connexion with the control of this pest is careful experimental work. An area of cacao should be chosen which could be divided into a number of plots, all having the same conditions of soil, drainage, exposure, etc. Each of these plots should receive a particular and definite course of treatment over a considerable period of time. This would furnish more or less definite results and give an opportunity for judging between the various materials used, and for comparison of treated areas with neighbouring untreated ones. The life-history of thrips should be carefully worked out, and an investigation undertaken as to the food plants of the species other than the cacao. I believe that experimental work of this kind is all that the Government can do in the matter. Each estate owner and proprietor will have to make practical application of the knowledge furnished him.

The Cotton Stainer.

At this time of the year, when there is very little cotton in the fields, cotton stainers may be seen in great numbers around the ginning factories, feeding upon the cotton seed that has got scattered about the ground. In St. Vincent and Antigua this has recently been specially noticed.

In St. Vincent this circumstance has been turned to advantage. Where large numbers of cotton stainers have collected on the waste cotton seed, they have been sprayed with pure kerosene from a Knapsack sprayer. In this way the number of cotton stainers may be greatly reduced in any locality, and if each estate would make a practice of scattering small amounts of seed near the estate buildings and then spraying frequently, much would be accomplished. Hot water is quite efficient for killing the cotton stainer, but must be very near boiling when used, which is a serious drawback to its use in many instances. On the other hand, seed which has been treated with hot water will be no less attractive to the cotton stainer, while seed sprayed with oil will not serve as a bait until the oil has all evaporated; as this takes some time, fresh seed will have to be put out, or the insects in the neighbourhood will wander away and get beyond the reach of future baits and sprayings. If this practice were general, it would probably give much better results than any field treatment, and the trouble and cost, which would, after all, be very slight, would be amply repaid.

It has been observed this year at several places in the Windward Islands that the cotton stainers collect in large numbers to feed on the seed of the Silk Cotton tree: when they are so gathered together they may be similarly killed by means of kerosene or hot water.

It is not definitely known how many different plants the cotton stainers feed upon, but there are probably several. In addition to the species and varieties of cotton and the Silk Cotton, there are probably other plants closely related to those on which the cotton stainers can live.

The Chicken Hawk and Mole Crickets.

According to Mr. Austin H. Clarke, the writer of the notes on the Birds of St. Vincent in the *West Indian Bulletin* (Vol. V, no. 1), 'the common Chicken Hawk proves, on investigation, to be, perhaps, as much of a benefit to the agriculturist as it is a pest to the poultry raiser, since it subsists very largely on the mole cricket, sometimes as many as twenty or more being disposed of at one meal. It appears, therefore, that if it be considered unwise to protect this bird, at least no bounties or rewards should be offered to aid in its destruction.'

METEOROLOGY OF JAMAICA: By Maxwell Hall, M.A., F.R.A.S., F.R. Met. Soc. *Kingston, Jamaica: The Institute of Jamaica, 1904.*

In this little work are recorded some of the more important results of observations made by the author between 1881 and 1902.

A short account is given of the instruments used in measuring the pressure, temperature, moisture, and motion of the atmosphere, etc., viz., barometers, thermometers, hygrometers, rain-gauges, anemometers, etc.

Much useful information is given in the tables at the end, including a summary of the Kingston monthly temperatures, 1881-98, average annual temperatures at different elevations in Jamaica, diurnal variations of temperature at Kingston, rainfall statistics, etc.

The mean temperature at Kingston (eighteen years' observations) is 78·8°; the highest maximum during that period was 96·7°, and the lowest minimum, 56·7°.

The average annual rainfall over the whole island is about 70 inches; in 1886 it rose to 90 inches, while in 1872 it fell to 45 inches.

There is also an interesting chapter on cyclones. It is stated: 'Fully developed cyclones appear in the West Indies for the most part during the months of August, September and October only; they follow a west-north-west course at first, then they turn north, and finally recurve east-north-east, if their course is long enough to permit of these changes.' In this connexion, also, the results of many years' observations are given; we fail, however, to find any reference to the hurricane of last August.

Those of our readers who wish to make themselves acquainted with the general principles of meteorology might well study this book, since the fact that it is specially adapted to the West Indies makes it all the more interesting and useful.

THE CHEMISTRY OF PLANT AND ANIMAL LIFE: By Harry Snyder, B.S. *New York: The Macmillan Company; London: Macmillan & Co. Ltd., 1903.*

As stated in the preface, this book is the outgrowth of instruction given in the School of Agriculture of the University of Minnesota, and it is evidently the work of a practical and experienced teacher of agricultural chemistry.

The first twenty-one chapters deal with general elementary chemistry, a knowledge of which, as the author insists, is essential to a proper understanding of the more technical side of the science. Consequently we find the more important elements and compounds fully treated, there being separate chapters on 'Oxygen,' 'Hydrogen,' 'Nitrogen,' 'Water,' etc. There are also chapters on the 'Composition of matter,' 'Laboratory Manipulation,' etc. The less important elements (from an agriculturist's point of view) and their compounds are treated more briefly. There is special attention paid to compounds which are of importance in agriculture: for instance, under 'Arsenic' we get an account of Paris green, under 'Copper' one of Bordeaux mixture.

Then follow chapters on the chemistry of plants and of the organic compounds found in them. Under non-nitrogenous compounds are treated—starch, cellulose, dextrines, sugars and other carbohydrates, also fats, waxes, organic acids, essential oils, etc. The nitrogenous compounds treated include the various proteids, alkaloids, glucosides, etc.

The chapters on the 'Chemistry of Plant Growth' and the 'Chemistry of Plants at Different Stages of Growth' give a number of interesting facts on the chemical changes that a plant brings about while alive.

The chemistry of special crops, chiefly in relation to their food values, is then dealt with; the most interesting chapter to West Indian agriculturists will be that on Indian corn.

The remaining chapters are devoted to a thoroughly scientific and practical account of the feeding of men and animals, the digestion of the different classes of food-stuffs, the amounts and kinds of food necessary for different animals, and the composition of animal bodies.

This book can thoroughly be recommended to teachers, and to the more advanced students, of agricultural science in the West Indies.

EXPORTS OF JAVA.

The following extracts are taken from the Report on the Trade and Commerce of Java for 1903, by Mr. Consul Fraser. They deal chiefly with sugar:—

The sugar crop was a record one, and prices ruled considerably higher than during 1902.

As regards coffee, the total production exceeded the estimates, but values in Europe were anything but satisfactory.

As above mentioned, the production of sugar exceeded that of any previous year, the total reaching 883,020 tons, or nearly 35,000 tons in excess of the year 1902. The results obtained, however, in the various divisions of the island were very dissimilar.

The prices obtained were much more satisfactory than in the preceding year, the lowest point being the equivalent of 7*s.* 3*d.* per cwt., as against 6*s.* 2*d.* per cwt. in 1902.

Notwithstanding the low values of the last two years, only five mills in all Java have been compelled to close.

The seed cane varieties, originally cultivated by the East Java Experimental Station, and a few other seed varieties have proved a decided success, both as regards production and immunity from disease, and an important increase in the area planted with this description of cane is noticeable. More attention is also being paid to cane selection by the establishment of 'selected cane' nursery gardens.

Prospects for the 1904 crop are at present very uncertain. Too much rain has fallen in some districts, and in others drought has prevailed. Everything now depends on the weather conditions during the next few months.

The exports of sugar to the United States—from the 1903 crop up to the end of the year—show a falling off, as compared with 1902, of 156,049 tons. Exports to the United Kingdom, which for some years have been practically nothing, according to the official figures, reached 26,126 tons, but the actual quantity was probably somewhat more.

In view of the uncertainty as to the continuance of the United States as the principal consumer of Java sugar, every effort is being made to increase the volume of trade with Eastern markets.

GLEANINGS.

The Port Royal Mountains branch of the Jamaica Agricultural Society proposes to hold an Agricultural Show at Hope, on July 6.

The *Voice* of St. Lucia, of June 16, speaking of the name Barbados bananas have made for themselves in England, states that equally good bananas can be grown in St. Lucia, and asks why this is not done.

Several pairs of Belgian hares are now ready for disposal at the Agricultural School, St. Vincent. The price is $1·00 per pair. Ages, from two to six months. They may be had singly, if desired.

According to advices from Puerto Cortes, Honduras, 633,900 bunches of bananas were shipped from there to the United States in 1894. In 1903 total shipments were 2,048,000 bunches. (Jamaica *Gleaner*, June 8.)

According to the *Montserrat Herald* of June 11, the Snow scale is doing great damage to the lime trees in that island. It is pointed out that spraying, to be effective, should be done in the earliest stages of the attack.

Mr. A. J. Jordan, the Curator of the Botanic Station, Montserrat, states that the plants of the Central American rubber transplant badly. Cuttings have been successfully struck from the well-ripened wood of the branches.

The Toffenburg goat 'Paul,' now at the Agricultural School, St. Vincent, can serve a limited number of goats. A fee of 6*d.* will be charged. Application should be made, in advance, to the Resident Master.

According to the *International Sugar Journal* for June, the amount of Java sugar imported into England is steadily on the increase, and, with a continued improvement in prices, it should replace a good deal of continental beet sugar in the British market.

The *Tropical Agriculturist* for May mentions that, on inquiry as to the result of the importation of Ceylon cattle into Trinidad some years ago, Mr. C. W. Meaden informs them that the cattle were of very little use. They are being kept, practically for show, in the Government House grounds.

The *India-Rubber Journal* of June 6, mentions a new patent taken out for the manufacture of boots, consisting of a very thick canvas, which is coated with a solution of gutta-percha, and then put under high pressure. The boots and shoes are said to look exactly like leather (blackened), and to wear very well.

We understand that at Nevis efforts are being made to start cacao cultivation in certain specially selected localities. At Madden's estate there are 15 acres of 2-year old trees, which are making very satisfactory growth.

A disintegrator has been erected at Spooner's estate, St. Kitt's, for the treatment of cotton seed. At a trial of this machine last week it was found to give good results, the disintegrated seed being in a very suitable condition for feeding purposes.

The Central American Rubber tree (*Castilloa elastica*) is now fruiting throughout these islands. Planters and others having this tree are urged to save its seeds for planting, as it is desirable to extend its cultivation in the West Indies. Curators of Botanic Stations will be glad to receive seeds, which will be sown, and the young plants distributed.

The importation of cacao in a crude form into the United States has increased in value from £200,000 in 1803 to about £1,600,000 in 1903, a rate of increase more rapid, proportionately, than that of coffee and much more rapid than that of tea, both of which it looks as if it was going to displace in another two decades. (The *Voice* of St. Lucia, June 9.)

The distillation of bay leaves imported direct from the West Indies, is carried on by us on a large scale. A sample consignment from Bermuda yielded an oil of a widely divergent character which cannot replace in practice the distillate from the West Indian material. Most striking are the considerably higher specific gravity and the ready solubility of the oil. (Semi-Annual Report of Messrs. Schimmel & Co.)

Mr. J. C. Augustus, manager of the River estate. Trinidad, recently forwarded to the Botanic Gardens a bunch of *Musa Cavendishii* (Governor Fig, Cavendish or Canary Island banana) weighing 134 lb. This, says Mr. Hart, was cut from a cacao 'contract,' and had no special cultivation of any kind. The bunch had thirteen hands, some containing twenty fingers each.

The Jamaica *Daily Telegraph* of June 11, states that Mr. G. N. Collins, Assistant Botanist in Tropical Agriculture, United States Department of Agriculture, is visiting Jamaica for the purpose of studying the agricultural conditions, with reference to their bearing on the development of Porto Rico. Mr. Collins is particularly interested in the coffee, cacao and banana industries, and the commercial possibilities of the numerous East Indian and African economic plants that have been introduced into this island.

The following note is translated from the *Journal d' Agriculture Tropicale* of May 31, 1904, being a review of Prof. H. Marshall Ward's 'Grasses' (Cambridge, The University Press): 'This manual on the grasses will be useful both to botanists and to scientific agriculturists. Unfortunately, the author, although he has taught in India, did not think it possible to include any but British grasses in the book. For the execution and control of details the author draws attention to the help he received from two of his assistants, whose names are already familiar to the colonial public—Mr. R. H. Biffen, author of researches on gutta-percha, and Mr. Lewton-Brain, now on the staff of the Imperial Department of Agriculture.'

WEST INDIAN PRODUCTS.

Canada.

The following is Mr. J. Russell Murray's report, dated June 9, 1904, on West Indian produce in Canada during the month of May :—

A general improvement in business has been apparent during the last month. New importing orders have been issued with care and on a limited scale, the large stocks not having sufficiently decreased. The Budget just presented to Parliament contains only one item of interest to the West Indies and that is the placing of West Indian molasses on the free list. As this amounted to $1\frac{3}{4}$c. per gallon, it will prove an additional barrier to the importation of mixed molasses.

SUGAR.

Importations direct to Montreal of British West Indian sugars are represented by the arrival of S.S. 'Naparima' from Trinidad with 14,000 bags of Refining Grades and the S.S. 'Nordkym' from Barbados with 14,008 bags and 2,946 hhds., which is equal to 4,300 tons. Since the issue of my last report the Beet market has seen considerable fluctuations, the highest point being reached on May 24, viz., 9*s.* $7\frac{1}{2}d.$ when the retrograde move began, and to-day's figure is 9*s.* $2\frac{1}{4}d.$ Local granulated sugars were advanced 10c. to 15c. per 100 lb. Muscovados in London are again quoted down to 9*s.* 3*d.* Local sales of West Indian have been irregular, several offers having been declined owing to sellers feeling confidence in advanced prices to follow, and with European and Cuban reports favourable to sellers we may yet see an entire recovery in prices. Nova Scotia has recently received some 12,000 tons of British West Indian sugar and about 4,500 tons are expected shortly. Canada's imports of West Indian sugar will this year be the largest on record.

MOLASSES.

The molasses trade has been steady, but demand only fair. The Schooner 'M. J. Taylor' is expected here shortly with a cargo from Barbados, and others will be shortly following. The free entry of West Indian molasses will stimulate trade and improve the general standard of quality.

COCOA-NUTS.

The market has been steady and prices well maintained, notwithstanding the lowness of quotations in New York, though these have improved some 10 to 15 per cent. The demand for cocoa-nuts has been quiet. Trade in desiccated products has been very quiet during the Spring. Jamaica cocoa-nuts are being distributed at $24·00 to $26·00 c. & f. Trinidads may be quoted at $20·00 to $21·00 c. & f. No other British West Indian nuts are on the market.

NOTES.

Sugars.—Consignments of Grocery sugars under 16 D.S. we can handle to good advantage now.

Cocoa-nuts.—Cocoa-nuts from other islands such as Dominica and Tobago can now find a good place, and we shall be glad to answer inquiries and to receive consignments. For Jamaica and Trinidad nuts we can place contracts.

Guava.—We have inquiries for guava fruit pulp in bulk put up in tins for jam manufacturers.

Onions.—In good demand. Sample lots from the Virgin Islands turned out well and will sell freely. No West Indian on market.

Molasses.—We have inquiries for Antigua molasses.

EDUCATIONAL.

School Gardens in Grenada.

The following note, on elementary school gardens in Grenada, is supplied by Mr. W. M. Smith, Acting Agricultural Instructor in that island :—

At the St. Mark's Anglican school garden, a few turnips have been grown, which were quite unusually large, the majority weighing between 2 lb. and 3 lb. Some carrots, too, grown there were excellent in size and quality.

At the Roman Catholic school garden, Bakers Bush, St. George's, some first-class onions have been grown.

St. Lucia Agricultural School.

The half-yearly examination at the Agricultural School, St. Lucia, was held on May 24, 25 and 26. The following is the general report of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.). In addition to this, special reports, on all the subjects taught at the school, were prepared :—

In most of the subjects, the senior boys have done very well. The worst papers done were those in Botany, in which only one boy obtained more than half the highest possible marks. The practical work in the field has evidently been well taught and the boys display a thorough knowledge of practical details. The practical work in the lecture room is not so well known, the master should take great care that the boys see and understand every detail of the experiments performed by him, and should explain carefully and see that the boys understand what it is each experiment proves. The boys should be allowed to perform some of the experiments themselves. This weakness was pointed out in my last report.

Vincent Goring comes out at the head of the senior class and has done excellent papers throughout, but especially in the Chemistry, Agriculture and Arithmetic. Flavien has also done very well, but is rather weak in Chemistry and Botany. DuBoulay's weakest papers were Botany and Agriculture. Montague and Lake have done worse this time than in the last examination ; their papers are weak throughout. Pedriel has somewhat improved his position, but he is still very low in the list.

The junior class is small and the results are very uniform : there is little to choose between any of the boys, as the marks show. The two new boys have done very fair papers and I regard them as promising pupils ; there is little to choose between them.

The examinations at the St. Vincent and Dominica Agricultural Schools were held in the week beginning June 20. The reports on these examinations will be published in due course.

DEPARTMENT NEWS.

Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, returned to Barbados from his official visit to the Northern Islands on Friday, June 24.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, will leave Barbados, on Monday, July 4, by the R.M.S. 'Eden,' on an official visit to the Northern Islands.

MARKET REPORTS.

London,—June 7, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' June 3, 1904; and 'The Public Ledger,' June 4, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—Demerara Sheet, 2/3; Venezuelan Block, 1/5½ per lb.
Bees'-wax—£7 2*s.* 6*d.* to £7 10*s.* per cwt.
Cacao—Trinidad, 57/- to 63/- per cwt.; Grenada, 52/- to 58/- per cwt.; Dominica, St. Lucia and Jamaica, 51/- to 58/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 38/- per cwt.
Copra—Trinidad, sundried, £16 15*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 11½*d.* per lb.
Fruit—
  Bananas—Jamaica, 4/6 to 6/- per bunch.
  Grape Fruit—10/- to 11/- per case.
  Oranges—No quotations.
  Pine-apples—Antigua, 14/- to 16/- per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 31/6 to 60/- per cwt.
Honey—18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/11; Cake, medium, palish, 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/2 to 1/3 per gallon; Concentrated, £13 5*s.* per cask of 108 gallons.
Lime Oil—1/5 to 1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/8 to 2/- per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—110's to 100's, 9*d.* to 10*d.*; 69's to 60's, 1/8 to 2/2 per lb.
Pimento—3*d.* to 3½*d.* per lb.
Rum—Demerara, 7*d.* to 8*d.* per proof gallon; Jamaica, 1/9 per proof gallon; Leewards, 7*d.* to 10*d.* per proof gallon.
Sarsaparilla—Jamaica, 9½*d.* to 1/- per lb.
Sugar—Crystallized, 16/3 per cwt.; Muscovado, grocery, 13/6 to 14/6 per cwt.; 89°, 9/6 on floating terms; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£11 15*s.* to £11 17*s.* 6*d.* per ton.
Tamarinds—Antigua, 8/- to 8/6; Barbados, 10/- to 11/- per cwt.

Montreal,—June 9, 1904.—Mr. J. Russell Murray. (In bond quotations.)

Bananas—Jamaica, $1·25 per bunch of 8 hands; $1·40 per bunch firsts; $1·65 per bunch Jumbos, c. & f.
Cacao—Jamaica, 11c. to 12c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $24·00 to $26·00; Trinidad, $21·00 to $23·00 per M. c. & f.
Coffee—Jamaica, medium, 8½c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb. c. & f.
Limes—Jamaica, $6·00 per barrel, c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 22c. to 25c.; Antigua, 21c. to 22c. per Imperial gallon.
Nutmegs—Grenada, 110's, 17½c. to 18½c. per lb. c. & f.
Pimento—Jamaica, 7½c. to 7¾c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·40 to $2 50 per 100 lb. c. & f.
  —Centrifugals, 89°, $2·05 to $2·15 per 100 lb. c. & f.
  —Molasses, 89°, $1·88 per 100 lb. c. & f.
  —Barbados, 89°, $2·25 per 100 lb. c. &. f.

New York,—June 10, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12½c. to 13c.; Jamaica, 10¼c. to 11½c.; Grenada, 12¼c. to 12½c.; Trinidad, 12¼c. to 13¾c. per lb.
Cocoa-nuts—Trinidads, $19 to $21; Jamaicas, $22 to $23 per M., selected.
Coffee—Jamaica, fair to good ordinary, 7c. to 7½c. per lb.
Ginger—Jamaica, 6½c. to 8c. per lb.
Goat Skins—Jamaicas, 52c. to 54½c. per lb.
Pimento—5¾c. per lb.
Sugar—Centrifugals, 96°, 3⅞c.; Muscovados, 89°, 3⅜c. to 3 7/16c.; Molasses sugars, 89°, 3⅛c. to 3 3/16c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 15, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—13c. per gallon (Imperial).
Sugar—$1·75 per 100 lb.

Barbados,—June 18, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·25 to $3·60 per 100 lb.
Cacao—$11·50 to $12·00 per 100 lb.
Cocoa-nuts—$10·75 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $11·00 per 100 lb.
Hay—95c. per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $75·00 to $76·00; Sulphate of potash, $67·00.
Molasses—12c. to 13c. per gallon (puncheon included).
Onions—Madeira (bunched), $3·00 ex store; Bermuda (loose), $2·52 per 100 lb.
Potatos, English—Bermuda, $4·50 per barrel.
Rice—Ballam, $4·50 to $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
Sugar—in hhds., 89°, $1·70 (packages included). Dark Crystals, 96°, $2·00 per 100 lb.

British Guiana,—June 16, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·00 to $9·00 per barrel.
Balata—35c. to 40c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. per lb. (retail).
  —Creole, 11c. per lb.
Dhal—New, $4·40 to $4·50 per bag of 168 lb., ex store.
Eddoes—$1·08 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—3½c. to 4c. per lb., ex store; Teneriffe, 2½c. to 3c. per lb.
Pea Nuts—Curaçoa, 4c.; American, 5¾c. per lb. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$3·75 to $4·25 per barrel.
Rice—Ballam, old, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·20 per barrel, $1·00 per bag.
Tannias—$1·92 per barrel.
Yams—White, $1·92 per bag.
Sugar—Dark Crystals, $2·15 to $2·16; Yellow, $2·25 to $2·50; White, $3·00 to $3·50; Molasses, $1·70 to $2·00 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—June 16, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to Good Red, $12·20 to $12·30; Estates, $12·35 to $12·60; Venezuelan, $12·55 to $12·80 per fanega (110 lb.).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—65c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·75 per 100 lb.
Onions—Teneriffe, $1·75 to $2·00 per 100 lb.
Potatos, English—$1·50 to $2·30 per 100 lb.
Rice—Yellow, $4·20 to $4·40; White Table, $4·75 to $5·75 per bag.
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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 59. BARBADOS, JULY 16, 1904. PRICE 1*d.*

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Fumigation of Imported Plants.

IN a previous issue of the *Agricultural News* (Vol. III, p. 74) the important subject of the fumigation of imported plants was dealt with.

In that article numerous instances were cited to show that most of the serious insect attacks, in different parts of the world, had been due to the importation of pests from other countries, where, owing to their having been kept in check by natural enemies, or from other causes, their effect on the crops had been insignificant. In new localities, under different conditions, these pests soon became a serious menace to agricultural industries. With a view to preventing such undesirable introductions, many Governments have prohibited the importation of plants likely to be infected, or have allowed their importation only after fumigation at the port of entry.

In order to furnish detailed information as to the action that has been taken in this connexion in some of the West India Islands, the Imperial Commissioner of Agriculture directed the preparation of a circular containing the laws and proclamations, issued in Jamaica from time to time, which have resulted in a system of fumigation of imported plants, which appears to work smoothly and which will, in all probability, prevent the introduction of new pests into that island. Copies of laws and proclamations issued in British Guiana and Dominica have also been printed.

This circular has been sent to those islands throughout the West Indies which have not, so far, taken any definite action in this matter. It is hoped that the information contained in this circular will be of assistance to colonies about to frame new laws, or to modify existing laws for the purpose of preventing the introduction of insect pests.

As the fumigation of imported plants has apparently been carried out with every success in Jamaica, it is suggested that similar regulations might be adopted in those islands where no such regulations exist. It is to be hoped that careful consideration will be given to this important matter, as there can be no doubt that it is greatly to the advantage of agricultural interests in the various islands that some such well-digested scheme for the prevention of the introduction of insect pests should be put into operation.

The Jamaica 'Seeds and Plants Importation Law' gives the Governor of the island power to prohibit or restrict the importation of seeds, plants, cuttings, buds or grafts, as well as their coverings or packages. In order that such importations may conveniently be dealt with as the law directs, their entry is restricted to the port of Kingston. There they are taken charge of by an officer of the Customs Department, whose duty it is to notify the Island Chemist, who is the authority to decide on any questions connected with the fumigation of proclaimed articles.

For the fumigation of large consignments of plants a fumigatory chamber has been erected at the government wharf, while small parcels are dealt with in a fumigatory box. Every care is taken to keep plants, cuttings, etc., alive and in good condition, and, so far as is known, but few instances have occurred where plants have suffered to any serious extent from the fumigating process.

Particulars as to the method usually adopted for the fumigation of plants have already been given in the *Agricultural News* (Vol. III, p. 138). Two sizes of fumigating chambers are recommended—the large, 8 feet by 6 feet by 6 feet inside, and the smaller, 2 feet by 2 feet by 2½ feet.

Hydrocyanic gas—the poison used for this work—is obtained by the addition of potassium cyanide to a mixture of sulphuric acid and water. One ounce of the cyanide should be used for every 300 cubic feet of space. The larger chamber will, therefore, require about 1 oz., and the smaller about 1 gramme.

Every care must be exercised by the operator not to breath this poisonous vapour, and, after the chamber has been used, sufficient time must be allowed to lapse before it is entered.

The fumigatorium recently erected at the Botanic Station, Dominica, has been used with entirely satisfactory results, and planters are co-operating with the Government in its endeavours to prevent the introduction of pests.

SUGAR INDUSTRY.

Production of Cane Sugar.

According to figures published in the *Yearbook of the United States Department of Agriculture*, the total world's production of cane sugar for 1903 amounted to 4,423,061 tons. Of this amount 1,130,000 tons were produced in Cuba, 1,000,561 in Asia, 513,000 in South America (excluding British Guiana), and 519,000 in Porto Rico and Hawaii.

The British West Indies exported 143,000 tons, British Guiana 125,000 tons, the French West Indies 65,000 tons, and the Danish West Indies (St. Croix) 13,000 tons.

Of these amounts the United States received, in 1903, 85,680 tons from the British West Indies, 76,947 tons from British Guiana, and 18,395 tons from the Danish West Indies.

The largest suppliers of the United States in that year were: Cuba (1,069,865 tons) and the Dutch East Indies (397,213 tons). The total imports of sugar, beet and cane, amounted to 1,882,191 tons.

Rum as an Illuminant and Source of Power.

The following is taken from the *West India Committee Circular* of June 21, 1904:—

Professor J. B. Harrison, Government Analyst of British Guiana, has furnished to the Government an important report on the use of white rum as a source of power and an illuminant, and this is now published for general information in the hope that it may lead to a more general demand in the colony for white spirits for those purposes.

Theoretically, alcohol has only three-fifths of the thermal value of petroleum, but for motor purposes it has been found that 28 per cent. of the theoretical efficiency of alcohol can be attained as against a maximum of 15 per cent. in the case of petroleum products.

The results of experiments in France, Germany and Austria are given. At a price of about 14c. per gallon, it has been proved in Germany that alcohol can compete economically with steam and other agents in engines of less than 20 horse-power. In France, it appears that the (monetary) efficiency of a mixture of alcohol and 18 per cent. of petroleum spirit is almost equal to that of petrol. In Austria, as the result of tests made on behalf of the Ministry of Finance, it has been recommended that cheap denatured spirit, specially suitable for motors, be prepared by mixing 100 litres of alcohol with 5 litres of petroleum spirit, 0·5 litre of pyridine or some heavy oil containing ketones, and 0·2 grm. of methyl violet in alcohol solution as a means of identification.

For lighting purposes, with incandescent lamps, alcohol has been found to be much superior to petroleum. With alcohol at 22c. per gallon, with one form of lamp of German construction, a light of 85 candle-power has been obtained at a cost of ¾c. per hour, while another form—the so-called arc lamp—gives a light of 550 candle-power at two-thirds the cost of an electric light of the same power at Berlin rates.

Professor Harrison points out that in British Guiana alcohol occupies a more favourable position than in Germany, France and Austria, with respect to petroleum spirit, the cost of the latter being high in a tropical climate.

Manurial Experiments in Jamaica.

The *Bulletin of the Department of Agriculture*, Jamaica, for June 1904, publishes the first part of a report by Mr. H. H. Cousins, M.A., F.C.S., Agricultural and Analytical Chemist, on the manurial experiments on sugar-cane in 1903. The report records the results of the experiments on six estates with the ratoon crop of 1903, following the first series of experiments with plant canes, analyses being given in each case. The following is a brief summary of these results:—

At Albion estate in the parish of St. Thomas, the results with D. 95 1st. ratoons are said to have agreed with those obtained in the previous year, the manures showing a general increase in all cases. With Mont Blanc canes, however, quite different results are recorded. Last year the manures produced no results; with the ratoon crop some of the plots showed an increase but not a profitable one, while others showed a deficit both in tonnage and in cost.

At Holland estate, St. Elizabeth, the results previously obtained were confirmed, all the manured plots showing an increase and, with the exception of the pen manure, a profit on manuring. Mr. Cousins remarks that the figures in connexion with these experiments indicate 'that the yield on this estate, despite long years of cane cultivation, can be increased enormously by drainage, by liming, by the growth of leguminous dressings, and, with due caution and judgement, the use of a little complete chemical manure.'

At Hillside estate in Vere, the same manures were applied as at Holland. With one exception, all the plots receiving manure showed an increase. It is recorded that the juice obtained here 'contained absolutely no glucose at all and the canes must have attained a state of complete chemical maturation.'

At Amity Hall, also in Vere, the increased yield by manuring was so small that losses occurred in all but two cases. This is attributed to deficient rainfall.

The results with ratoons at Caymanas estate in St. Catherine were confusing and at variance with those obtained from the plant canes, while at Vale Royal in Trelawny unfavourable seasons are said to have reduced the returns. The opinion is expressed that in an average year fertilizers should prove profitable.

It might be added that the work of supervision of these experiments has now been specially provided for by the appointment of Mr. T. H. Sharp, Jr., B.S.A., as Superintendent of sugar experiments.

AGRICULTURAL SOCIETIES.

Dominica.

The following report of a meeting of the Dominica Agricultural Society held at the Court House, Roseau, on June 25, has been communicated by Mr. A. K. Agar, the Honorary Secretary:—

The report of the committee appointed to consider a Produce Association was read, but the scheme was not found practicable. The committee for the management of the 1905 Agricultural Show was appointed. The Vice-President read some notes compiled by Mr. J. F. Scully on the climatic and agricultural conditions prevailing in his district, and a discussion followed. A few other minor items of local interest were also brought forward.

STOCK NOTES.

The following notes are taken from the *Farm Journal* of Philadelphia:—

Love of stock is one of the essential elements of successful stock raising.

Feeding a little linseed meal occasionally to stock is beneficial, keeping the system regulated.

Land that dries quickly after a rain is best for a poultry yard. Sour, tainted, or wet land will slaughter more fowls and chicks than will the dreaded roup.

Wet the horses' feet every day with a sponge, if you do not put them in a soaking tub. Simply wetting them every day will do more than you think to keep them in good condition.

All grains fed to hogs had best be soaked twelve hours before being fed. Especially is this necessary with barley, peas, and corn. One of the best grains for growing swine is oats.

Some cows will give down their milk best when they have a little grain in the manger before them to work at while the process of milking is going on. It is worth while to humour the fancy of these cows.

To make the horse's coat shine, feed him a bit of oil meal every day. Begin lightly: not more than a tablespoonful at first. Gradually increase until he will take a pint, then hold at that for a while.

Horses that are given water with regularity fatten most readily. They can be taught to take water before breakfast, and this light drink seems to be worth a great deal to them. In an effort to put flesh upon an animal, the water is as big a factor as the grain.

When a horse acquires the bad habit of gnawing at the manger, or the sides of the stall, or chewing at his halter rope, rub on some mutton tallow, as the taste of it is very disagreeable to him. A few applications are all that is necessary to break him of this habit.

Salt regularly. Many do not do this, but wait a week or two and then give the cattle all the salt they will eat. Being hungry for it, they are apt to overdo the matter. Then down comes your milk test. Salt possesses medicinal qualities. Use it carefully for that reason.

Thoroughly scald the churn, but have it cool when the cream is put in. If it is too warm the texture of the butter will be injured. From time to time, while the cream is accumulating before churning, it is a good plan to stir it once in a while. Keep in a warm, not hot, place, and be sure the cream is sour clear through before beginning to churn.

There is a theory that nothing a cow eats affects the quality of her milk. If she is made to produce 5-per-cent. milk she will do it no matter what she has to eat. In practice this does not hold good, however. You cannot feed a cow dry straw and get rich milk. Every farmer knows that corn-meal will make the richest milk of anything. Pumpkins will also give us a thick, yellow cream.

Cocoa-nut Oil for Toothache. With regard to cocoa-nut oil it may be useful to mention that it is used by the natives as a specific for toothache, and is said to be a never-failing remedy. The directions for use are as follows:—Procure a fresh cocoa-nut, cut it in half, place one half with the concave side facing upwards on a large cup containing some cotton wool, and inside the cocoa-nut put some live charcoal. When the oil exudes on to the wool, take the latter out, and insert it with the aid of a blunt needle into the aching cavity. (*Consular Report* on trade of Kiungchow.)

WEST INDIAN FRUIT.

MANURING CITRUS TREES.

In a previous issue of the *Agricultural News* (Vol. III, p. 100), we published a note by Mr. E. A. Agar of Dominica, on the use of pen manure with citrus trees. Mr. Agar's experience was that pen manure increased the size of the fruits at the expense of quality. The following note on the same subject, by Mr. W. M. Smith, Acting Agricultural Instructor at Grenada, will be of interest:—

A grape fruit tree, growing at Nianganfoix estate, Grenada, from the roots of which all the soil, to a depth of about 12 inches, had been washed away, has been treated in the following manner with the best results: A 3-foot barrier of bamboos, enclosing a space of 7 feet square, was placed around the stem of the tree, and a compost was gradually accumulated in it for a period of about three months, until it reached the height of about 2 feet 6 inches. This compost was formed of sweepings from house, kitchen and yard, as well as a small quantity of pen manure and earth.

This treatment was given just before the tree blossomed in 1903. It now has most luxuriant foliage, has given a big crop this year, and the fruits were not only large, but also as fine in quality as any grown in the island.

PLANTING COCOA-NUT TREES.

The British Guiana Board of Agriculture has recently published the following directions for planting cocoa-nut trees:—

Selection of Seed.—Nuts which are quite ripe should be chosen from trees which bear good crops, and which are neither very young nor very old. They should be picked and not allowed to fall or they may be injured, and they should be kept for about a month before sowing. Very big nuts are not always the best, because only a few may be borne on the tree; oblong nuts should be avoided.

Sowing.—Trenches should be dug about 6 inches deep in good, light soil and the nuts placed in them on their sides about 6 inches apart, with the bigger ends slightly downwards. Ashes should be placed in the trenches to keep away insects. The nuts should be half covered with soil and over all should be put about 6 inches of grass or cane trash. In dry weather, they must be watered every two days. Some of the nuts may not germinate, but in from five to eight months those that have sprouted will be ready to plant out.

Planting out.—At distances of about 30 feet apart dig holes 3 feet wide and about $2\frac{1}{2}$ feet deep. The soil should be taken out of the holes, thoroughly mixed with well-rotted manure or ashes, and then put back again. Put in the sprouted nut on its side and cover it with soil. All the roots that are injured should be cut off before planting.

Treatment after Planting.—Care must be taken that the nuts are kept covered with earth, as they tend to grow out of the soil in time. The soil round the palms must be kept clean and free from weeds and should be dressed about once a year with manure and ashes. Catch crops such as cassava, cotton, maize, sweet potatos, etc., may be planted between the trees, but not too close to them.

In about five to six years' time the palms will begin to produce fruit, but they will not bear well until the seventh to twelfth year after planting.

COMPOSITION OF ORANGES AND LEMONS.

The following notes on the chemical composition of oranges and lemons are taken from Snyder's *Chemistry of Plant and Animal Life*, reviewed on p. 219 of our last issue:—

Oranges contain from 10 to 15 per cent. of solid matter, the larger portion (80 per cent.) being sugar. The citric acid content ranges from 1 to 2·5 per cent. in different varieties. The amount of protein, fat and fibre is small. The ash or mineral matter averages about $\frac{1}{2}$ per cent. and is composed mainly of potash and lime with smaller amounts of other compounds. The iron and sulphur content in some kinds of oranges is larger than is ordinarily found in other fruits. In average oranges, the physical composition is as follows:—

Rind, 20 to 30 per cent.; pulp, 25 to 35 per cent., and juice, 35 to 50 per cent.

Lemons differ from oranges in containing larger amounts of citric acid and smaller amounts of sucrose, levulose and dextrose. The average composition of lemons is as follows:—

Physical Composition.		Chemical Composition.	
Rind	25 to 35 per cent.	Solids	10 to 12 per cent.
Pulp	25 to 35 „ „	Sugar	2 to 4 „ „
Juice	40 to 55 „ „	Citric acid	6 to 9 „ „

The ash of the lemon is somewhat similar in composition to the ash of the orange, but is present in larger amount.

COTTON NOTES.

Expeirments with Varieties in British Guiana.

A report by Mr. R. Ward, on the experiments carried on at the Botanic Gardens, British Guiana, in growing various kinds of cotton, was published in the Demerara *Official Gazette* of May 24 last. We take the following extract, from which it will be seen that the Egyptian and the introduced Sea Island, are spoken of as giving the best results:—

Last year there were obtained, from different sources, small quantities of seed of the following varieties:—Buck, Brazilian or Kidney, Native Sea Island, introduced Sea Island, Egyptian, and Upland.

The three first-named local varieties grew into plants which were much larger andmore bushy than the three last-named. Being much stronger growing, they require more space between the rows and between the plants in the rows. Plants raised from the seeds of local varieties took a longer time in coming into bearing than the introduced varieties of Sea Island and Egyptian, these latter yielding their second crop when the former were bearing their first. From this it will appear evident that it would not do to raise these large-growing sorts every year from seed; but as they ratoon readily and well, they should be treated as perennials, and carefully cut back after the reaping of each crop.

The quality of fibre varies very considerably in these different kinds. The introduced Sea Island appears to give the best staple; next to this in length of staple and first in silkiness is the Buck cotton—probably the same as the Black Peruvian. The other varieties—Native Sea Island, Brazilian and Egyptian—somewhat resemble each other in the quality of their product, the cotton from them being shorter in staple and less silky than that from the others referred to.

The Egyptian and the Upland varieties are the first to bear from seed, the crop taking three or four months to mature. Next follows the introduced Sea Island, which requires four to five months. The others take from six to eight months. The ratooning power of the Sea Island is yet to be tested; but it is evident that the Egyptian variety must be treated as an annual.

Owing to the bad season and irregular growth, it has not yet been possible to compile a reliable record as to yield; but speaking generally, I would say that the best yield has been got from the Egyptian (Mit Afifi variety), the introduced Sea Island coming after. The others had yielded very little when the time came for them to be cut back; and it is as ratoons that I am expecting them to show to best advantage.

In our small experiments we were fortunately not troubled with the cotton worm, so destructive to some cultivations; but the insect known as the 'cotton stainer' was very troublesome. Various methods of trapping this are advocated, but further experiments are necessary before any one of these can be pronounced the most effective way of dealing with this pest. As regards the cotton worm, its treatment with Paris green and lime has been found to be absolutely trustworthy if applied at the proper time.

On the branches and stems of weak and sickly plants, some scale insects have been met with; but these, while affecting the plants, do no harm to the cotton. As a general treatment which will have a favourable result on the various insect pests that are liable to attack the cotton, it will be found useful, when pruning or replanting, to remove carefully to a convenient place and to burn all dead branches and stems of old plants.

Sea Island Cotton.

An interesting article in the *Yearbook of the U. S. Department of Agriculture* for 1903, on the 'Principal commercial Plant Fibres' contains the following reference to Sea Island cotton:—

Sea Island cotton is obtained from a plant known technically as *Gossypium barbadense*. This species was found in the West Indies when Columbus first visited those islands. The best varieties of Sea Island cotton have been developed by careful seed selection and cultivation on James and Edisto islands, along the coast of South Carolina. This cotton is cultivated on other islands and the adjacent mainland in that region, and also in sandy soils in the interior, across southern Georgia and northern Florida. Fresh supplies of seed are brought from the coast every two or three years to keep up the quality of that grown in the interior. During the last two years the cultivation of Sea Island cotton has been re-introduced into Porto Rico and the British West Indies, and under improved conditions it seems likely to become more profitable there than before it was crowded out by the sugar industry.

The Sea Island plant differs from that of Upland cotton in its larger growth—3 to 8 feet high—with longer and more flexible branches, more deeply lobed leaves, bright yellow flowers, and sharp-pointed bolls, having three, instead of four or five, divisions or locks. The seeds are black or dark brown, and are not covered with a persistent fuzz. The lint is $1\frac{3}{8}$ to 2 inches long, finer and longer than that of Upland cotton, and usually softer and more lustrous. It commands a price ranging from 2c. to 15c. per ℔. more than Upland cotton, but it requires greater care in its production and is more exacting in regard to soil and climate. It yields less per acre (100 ℔. to 300 ℔.), and costs more to pick and gin. It is used in making fine threads for sewing and for laces, fine yarns for fancy hosiery, for weaving into the finest lawns and dimities, and generally for the most expensive grades of cotton goods.

THE GUAVA AS A WEED.

M. Paul des Grottes, in the May issue of the *Journal d'Agriculture Tropicale*, draws attention to the care and judgement that should be exercised before introducing new plants into a country. He mentions the various superior cultivated guavas, the 'pear,' 'strawberry,' and 'Cayenne' varieties, which he says he would not hesitate to introduce anywhere.

The case is different with the common wild guava. In spite of the delicious preserves that can be made from its fruit, its value for stock, its use for fire wood, etc., the guava is a weed.

The qualities that render it a nuisance are the rapidity with which it reproduces and the difficulty of destroying it when established. Domestic animals, as well as birds, spread the bush in pastures, they eat the fruits, and the seeds pass through their bodies, uninjured and ready to germinate with vigour.

Merely cutting back the bushes to the level of the soil is useless and has to be repeated every three months or even at smaller intervals during the rainy season. The only way of exterminating it is to remove every root. The author mentions that the best instrument, for this purpose, he has seen, was in St. Lucia; it was introduced by the Agricultural Superintendent (see *Agricultural News*, Vol. II., p. 43). With the use of this machine, a native of moderate strength could easily clear a hectare ($2\frac{1}{2}$ acres) of bush in a day.

RABBIT KEEPING IN THE WEST INDIES.

Mr. John Barclay, the Secretary of the Jamaica Agricultural Society, has forwarded notes on rabbit keeping, specially written for the *Agricultural News*. Mr. Barclay deals with the general principles of rabbit keeping, including housing, feeding, breeding, etc.

In the first instalment useful information is given as to the breeds best suited to the West Indies, etc.:—

I know of no hobby that can be made so practically useful as the rearing of poultry and rabbits. Both poultry and rabbits can, at the same time, provide as much vexation as anything I know of, if losses are the general rule. It is to prevent occurrences of this sort, as far as possible, by furnishing information from actual practice in the raising of rabbits, that these notes are written.

HOW RABBITS ARE USUALLY KEPT IN JAMAICA.

In Jamaica, rabbits are kept by every other small settler in some parishes, both for the sake of their manure and for their table value; most owners of estates, too, keep a few both as pets and for the table. There is no market for them yet, however, in the same way as there is for poultry, pork, and mutton, although a very limited trade does occur in Kingston during the tourist season.

There is, unfortunately, no method, and little knowledge, among most small settlers as to how these animals should be kept, and their practices are often abominable. The rabbits are usually kept in hutches set on posts, about 4 feet from the ground, to prevent dogs jumping up. There is a hutch of one apartment, not often water tight, with a little open platform in front. Here bucks, does and young are often kept together in the one apartment. This is unnatural and cruel. The bucks torment the does, often the latter torment each other. The does have no privacy when they have young. The results are that the young ones are often killed as they are born, either by the doe herself or by other does, if she is not their superior in strength; perhaps one or two young ones manage to escape harm and grow up. Running with bucks, the young does are bred before they are fully grown, and so deterioration goes on. Fortunately, the agricultural propaganda persistently kept up through Jamaica, and which deals with live stock as much as with cultivation, has at least inculcated a knowledge of the importance of fresh blood, so much so, for instance, that one breeder of predigree pigs reported to me that the prejudice against inbreeding was being carried to extremes. I considered this satisfactory. Thus settlers are now more frequently changing and exchanging their bucks. The additional evil of the promiscuous breeding of bucks and does of the same family is, therefore, not so common as it was, although still too common.

In the wild state there is plenty of room, plenty of freedom, and the animals have abundance of exercise in securing their food. Moreover, the does can retire, each to her own particular burrow, and be in seclusion when they bear their young. The young rabbits have room to grow and escape the attacks of larger rabbits.

The kind of rabbits kept among small settlers is thus generally very small, and poor-looking; yet there is arising a desire for better stock, and inquiries for Belgian hares, pure, three-quarter or half-bred, to improve common rabbits, are becoming more frequent. Among larger planters in Jamaica, Belgian hares, pure or nearly so, are comparatively common, and the demand for fresh blood of that variety, though not so wide-spread as it might be, considering the number who keep rabbits, is regular, if limited.

The common rabbits are of all colours,—white, grey and white, black and white; but the uniform grey of the Belgian hare is becoming more and more common. There are a great many different breeds of domestic rabbits throughout the rabbit-breeding world, but we are best suited here with the thin-coated, active breeds. The striving after size in animals for hot countries is, I think, not best served by the introduction of large, heavy-coated animals. These all the more quickly deteriorate, and the progeny from a large breed on a smaller one is, just as often as not, small and weakly, or, if big, sluggish in nature. The best method of improving a breed, increasing it in size and hardiness, is by care, attention and knowledge in breeding, feeding and housing, more especially in allowing animals to mature before breeding, and in breeding no near relations together.

BREEDS FOR THE WEST INDIES.

The breeds kept most in the United Kingdom are—the common wild rabbit (which is usually grey, though in some parts black is frequently seen), the Silver Grey, Belgian Hare, Flemish Giant, Angora, Dutch, Lop Ear, Himalayan, and Patagonian.

Of these the following have been kept in Jamaica:—Belgian Hare, Silver Grey, Flemish Giant, Lop Ear, and the Angora. But no heavy-coated breed should be kept in warm climates. Of those mentioned the choice for the West Indies is the Belgian hare. This is really not a hare, and is no relation at all of the hare of the field. It is simply an improved rabbit.

The Belgian hare is comparatively common in Jamaica and thrives easily with such ordinary attention as every domestic animal should receive. It is large, not thick-set, but rather slim, and active, of a dark-grey colour, deepening sometimes to a rich brown on the back. I have had does weighing 10 lb., but find such not so successful as breeders as those weighing from 7 to 8 lb. Bucks I have had to 12 lb., but such size and weight do not fit them for breeding successfully. Bucks from 8 to 10 lb. are as heavy as is desirable. Of course, for animals fattened for table, the more weight the better, but very fat animals must not be kept over long. A favourite breed for crossing with Belgian hares among breeders in the United Kingdom is the Flemish Giant rabbit. These animals grow to a large size, but are very slow and clumsy. The does are not good mothers, as they are so heavy-footed that they are apt to trample on their young. Thus the custom is to use the Flemish Giant buck with the Belgian hare does, and this cross results in a fine table animal, putting on weight quickly, and easy to fatten. The young ones of this cross, pushed on with a little grain and milk, after weaning, can be used at three months old, when the flesh is white and tender—very good for an invalid and convalescent diet, being more delicate than chicken. The Flemish Giant is of a deep iron-grey colour, though rather heavily coated, and the fur is loose and not thick.

A year or two ago a Belgian hare craze or fad broke out in the United States and great sums were paid for show specimens. It is best, therefore, to import from the United Kingdom where more sensible notions prevail in regard to the proper place and value of the Belgian hare. The sum of 10*s.* is enough to pay there for very good, selected specimens for breeding. In Jamaica, young ones can be had for 4*s.* and upwards for fair specimens, and 10*s.* each for a good well-grown buck or doe should secure well-bred stock.

YLANG-YLANG.

In a previous issue of the *Agricultural News* (Vol. III, p. 151) mention was made of the Ylang-Ylang tree, the flowers of which yield a valuable perfume. In their recent Semi-annual Report, Messrs. Schimmel & Co. state that the exceptional demand for the oil has been continued, their sales for 1903 being much greater than those for 1902. The following account of the cultivation of the tree is then given:—

Flacourt, in *Revue des Cultures Coloniales* (Vol. 13, p. 366 ; Vol. 14, p. 16), makes some interesting communications respecting the cultivation of ylang-ylang trees in Réunion, which are based on practical experience, and therefore contain much useful instruction for those who are interested in the subject. Both *Unona latifolia* and *Unona odorata** which have now for a long time been grown as trees for avenues are suitable for the cultivation. But absolute necessities therefor are a tropical tranquil climate, and a porous soil containing a certain amount of moisture.

In order to grow the trees from seed, the latter, taken from the ripe fleshy berries, must be freed carefully, by repeated washing, from all traces of pulp, and immediately after the last washing be placed in the seed-bed which may be laid out in a rich, well-manured soil. The germ-plants make their appearance after forty to sixty days and after one to one and a half months are planted out in nurseries which must be situated in a shady place.

This planting out in nurseries is, in Réunion, generally preceded by a process which consists of this: the young germ-plants are placed singly in vessels of beaker-form, so-called 'tentes,' which can be readily constructed from the leaves of *Pandanus utilis*. The plants, transposed in one or other manner, require about two months to attain a height of 25 to 30 cm. and to develop sufficiently.

At this stage the plants are best suited to the process of transferring to the plantations. During the next two years the latter must be tended with care, and yet yield nothing.

From the third year onwards the trees begin to flower and the crop can already be estimated at 150 to 200 francs per hectare ($2\frac{1}{2}$ acres). It is, however, necessary to see that the trees do not grow to a greater height than 2·5 to 3 metres. This is done by cutting off the tops, which at the same time causes a powerful development of the lateral branches and an abundant formation of blossoms, so that the yield becomes very remunerative.

The flowering period of the ylang-ylang trees commences in Réunion from January to February, but a regular formation of blossoms, giving the best yield, can only be reckoned upon from May to August. Those blossoms which are freshest when submitted to distillation yield oils of better quality. Fifty to 64 kilos. of freshly gathered blossoms produce 1 kilo. oil, that is, 1·56 to 2 per cent. The yield from one hectare of plantation laid out according to Flacourt is annually from 3 to 4 kilos. oil, giving a net profit from 1,116 to 1,616 francs.

* The botanical name of the ylang-ylang tree is usually given as *Artabotrys odoratissimus*, of which *Unona odoratissima* is a synonym. [Ed. *A. N.*]

AGRICULTURE IN THE BAHAMAS.

The following extracts are taken from the *General Descriptive Report on the Bahamas Islands* in which is included the annual report to the Secretary of State for the Colonies for 1902:—

The surface rock in all the Bahama Islands is exceedingly hard, so much so that if struck sharply with a steel instrument, sparks are emitted, as in the case of flint; this rock, however, is of very different texture beneath, and is easily sawn into blocks, making an excellent building stone. Moreover, if the rock is blown up and sufficiently pulverized, it forms an admirable medium for the growth of a variety of economical products, and is especially adapted to citrus fruits. There can be no question also that cotton would thrive in it, though, as I have pointed out elsewhere, the drawback to this culture is the practically certain attacks of formidable insect pests.... Unless the cultivator is prepared to deal with these pests scientifically, as is the case in the southern States of America, it is hopeless to expect to succeed with cotton. In these islands there is no such thing as scientific culture. It is true that pine-apples are grown on a large scale, especially in Eleuthera, and that a considerable measure of success has been achieved by certain growers, but it has been laid down as an axiom, that the plant will only thrive in the red soil mentioned, and when exhaustion of properties which render it a suitable food takes place, fertilization is resorted to, and an American mixture is used, whose component parts are entirely unknown to the users of it. Recent experiments, however, have proved that pine-apples will thrive elsewhere. At this moment there are some small plantations near the town, where the pines are being grown in the interstices of the most unpromising-looking honeycomb rock; there can be but a small deposit of humus in these fissures, but nevertheless, up to the present, the plants look healthy and vigorous.

Almost all tropical fruits will thrive in Bahamas soil, given sufficient depth, but many trees may be seen growing out of interstices in the rocks, and this is especially the case with the sapodilla which seems to grow under the most adverse conditions, and produces excellent fruit. Several groves of cocoa-nuts exist, but the conditions are not so suitable to their growth as was considered to be the case some years ago, when extensive experiments were made. This palm thrives in some places near the sea, but I do not think its culture could ever be made a paying speculation.

So much has been written in regard to the 'sisal' plant, that I need only say its cultivation is extending, and undoubtedly it grows well, established in places where the roots have room to spread. I see no reason why the extraction of the fibre should not be a profitable industry in these islands. Even taking into consideration adjacent competition and natural fluctuation of the market, the plant needs no special culture and is practically free from insect pests, drought does nor affect it, and, on the other hand, it is impervious to the torrential rain which generally occurs during the summer months. The leaves can be readily cleaned by hand, and there are good machines which do the work in a more expeditious manner. The type generally used here is the 'Todd' machine, which I understand is as good as any in the market.

It is gratifying to be able to report that the Sisal Fibre Company of Little Abaco continues its work with every prospect of success. The company has about 5,000 acres under cultivation and 145 tons of fibre were shipped at an estimated value of £4,350. Additional machinery has been placed upon the estate, and it is expected that during the next year the output will approximate £15,000 in value.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 223 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, JULY 16, 1904. No. 59.

NOTES AND COMMENTS.

Contents of Present Issue.

A short summary of the results of manurial experiments with the sugar-cane in Jamaica is given on p. 227 ; also a note by Professor Harrison, of British Guiana, on the use of rum as an illuminant and a source of power (p. 226).

Our cotton notes include a report on experiments with different varieties in British Guiana, and a short account of Sea Island cotton from the *Yearbook of the United States Department of Agriculture.*

The first instalment of Mr. Barclay's rabbit notes is published on p. 230.

On p. 231 we publish an extract on agriculture in the Bahamas; information relating to the exports of those islands will be found on p. 233. A Curator is required for the Botanic Station which is shortly to be established. For particulars see p. 238.

In an interesting note on black blight in Grenada (see p. 234) Mr. Ballou discusses the cause of this pest, the trees most frequently affected, and proposals for its extermination.

Manurial experiments with cotton are to be carried out in the Leeward Islands. A complete list of the proposed experiments is given on p. 237. These are to be arranged along the lines of the sugar-cane experiments in the Leeward Islands.

Mr. J. R. Jackson's usual monthly report will be found on p. 238. A quiet tone is reported in the London drug and spice markets.

Rabbit Keeping in the West Indies.

We have published in these columns articles on the management and rearing of poultry and ducks, specially written by Mr. John Barclay, the energetic Secretary of the Jamaica Agricultural Society.

In this issue we commence a series of similar useful articles dealing with rabbits. Rabbit keeping is a remunerative industry, and one particularly in favour among small settlers in these islands.

Mr. Barclay has had considerable practical experience in rearing birds and rabbits and also excellent opportunities for becoming acquainted with the special requirements for their successful management in these islands. We are therefore confident that his articles will be of great service to those of our readers who are interested in this branch of agriculture.

Sisal Hemp from Caicos Islands.

An excellent sample of sisal hemp was recently received from his Honour the Commissioner of the Turks and Caicos Islands, who wrote, under date March 22, 1904: 'The sample I send you is from a plantation owned by an American firm. From the two fibre plantations in the Caicos we exported last year 443,870 lb., valued at £6,488.'

The sample, which was a remarkably good one, the fibre being bright and strong, was forwarded by the Imperial Commissioner of Agriculture to Messrs. Ide and Christie, who have furnished the following satisfactory report :—

'Your favour of the 5th. inst. with sample of sisal hemp from the Caicos Islands safely to hand. The latter shows first-class material, better than any of the Mexican and as good as the best from the Bahamas. Value, £33 per ton, but less to sell quantity. For the past few years we have seen small lots on this market. Manila hemp being on the downward move, all hard hemps are likely to fall in value.'

The Juniper Cedar.

The *Bulletin of the Department of Agriculture,* Jamaica, for April 1904, has an article on the Juniper cedar.

Dr. M. T. Masters pointed out in an article in the *Bulletin of the Botanical Department,* Jamaica, for April 1901, that the Juniper cedar of Jamaica was not, as had been supposed, identical with that of Bermuda. This opinion has been confirmed by Professor C. S. Sargent, who states that it is identical with the special red cedar which is a native of Florida.

Professor Sargent separates *Juniperus virginiana,* as described in his *Silva of North America,* into three species: (1) *Juniperus virginiana,* the red cedar of the North, (2) the red cedar of Florida, which is not distinguishable from *Juniperus barbadensis* of the West Indies, and (3) the red cedar of western America.

This opinion, it is stated, is of importance commercially, for 'the Florida tree is the pencil cedar of commerce.' The trees of Florida and Jamaica will now be known as *Juniperus barbadensis.*

Fish Oils from Dominica.

Samples of two oils obtained from Dominica were recently forwarded to experts by the Imperial Commissioner of Agriculture with a view to ascertaining whether they possessed any commercial value.

The first sample—one of shark-liver oil—has been reported upon by Messrs Burgoyne, Burbidges & Co. as follows:—

'We have examined the sample of shark-liver oil sent to us, and beg to say that it is of good quality, and fairly sweet, and we consider the value of same about £15 to £16 per ton, landed, packages free, less 2½ per cent. There would be no use for this oil in medicine, but it could perhaps be used for leather, etc.'

In regard to a sample of black fish oil, which is produced in fair quantities in Dominica, Messrs. Gillespie Bros. & Co., to whom the sample was sent, write as follows:—

'Our brokers report that this is a nice, sweet oil but rather thick. They value it here at £15 per ton *ex* dock, less 2½ per cent., at which price it should command a ready sale. This time last year the value would have been from £17 to £18 per ton, but the low price of linseed and other oils has depressed the market for the time being.

'Our brokers further suggest that shipment be made in barrels or any other casks, and that care should be taken that they are in good condition for the voyage. Parcels of 10 tons and over would probably command a better price than that obtained for small lots.'

United States Tropical Experiment Stations.

The report of the United States Secretary of Agriculture for 1903 contains references to the work that has been carried on in the Experiment Stations in Hawaii and Porto Rico.

In Hawaii experiments have been continued on the tannia rot and potato rot. The former may be prevented, it is stated, by proper attention to methods of irrigation and the application of suitable fertilizers; the potato rot can be combated by the use of Bordeaux mixture.

It is hoped that the investigations in connexion with corn cultivation will succeed in placing this industry once more on a satisfactory basis, several introduced varieties having given excellent results.

Preliminary operations have been performed at the new Porto Rico Station. 'A beginning has been made to establish nurseries of citrus fruits and rubber and tea plants, as well as varieties of mangos, bananas, and tropical fruits. Arrangements have been made by which improved varieties of tropical fruits are being secured from different portions of the West India Islands through the courtesy of the Commissioner of Agriculture for the British West Indies.'

Experiments have been commenced to test various fibre plants, leguminous crops for restoring the soil, etc.

At the La Carmelita plantation 10 acres have been placed at the disposal of the station for experiments with coffee to test the different methods of pruning, shading, fertilizing, etc.

Hedge Plants.

An interesting experiment has been carried out at the Botanic Station, Montserrat, to ascertain the most suitable plants for making hedges. This forms an excellent demonstration plot, as one can see at a glance which plants are likely to serve best for this purpose.

The following plants have been grown: cushaw (*Acacia tortuosa*), logwood (*Haematoxylon campechianum*), wild coffee (*Clerodendron aculeatum*), myrtle lime (*Triphasia Aurantiola*), and bread-and-cheese (*Inga Unguis-cati*).

The *Acacia*, started from seed in 1903, has formed a dense hedge, 4½ feet high, and the prickly nature of this plant should render it very suitable, since stock would be unable to push through. The logwood hedge is now 5 feet in height: the seeds were sown in 1902.

Of this experiment, Mr. Jordan reports: 'It is probable that cushaw and logwood will be found to be the best plants for the purpose of hedges. Seeds can readily be obtained from the wild plants in May. As both plants are rapid growers, it is better to sow the seeds in the position required than to transplant.'

Mr. Jordan estimates that the cost of planting such hedges would be about £2 per mile, with an additional 6*s.* per mile per annum for trimming and supplying.

Exports of the Bahamas.

We publish on p. 231 of this issue extracts from the recently published *Descriptive Report on the Bahamas Islands* relating to agricultural industries. A few notes on the principal exports from these islands may also be of interest.

The exports figuring most prominently, with their values, included: sponges (£97,584), Bahamas hemp (£37,574), pine-apples (£36,957), canned fruits (£9,515), and turtle-shell (£8,886). Practically the whole of the hemp was exported to the United States; also a large proportion of the sponge. On the other hand, the United Kingdom received most of the turtle-shell.

The agricultural industries are principally the growing of pine-apples and oranges, both of which go to the United States. In the growing of oranges, Florida has proved so keen a competitor that it scarcely pays to ship them from the Bahamas, especially in the face of the duty of 1c. per lb. levied in the United States on foreign imports. The exports of this fruit have declined in value from £3,148 in 1900 to £1,446 in 1902. It is suggested that grape fruit cultivation would prove more remunerative.

It is reported that there is little attempt at scientific culture, although there are signs of awakening to the value of land. The islands are handicapped in their development by the scant soil and absence of natural water supplies. 'Agriculture is practically a neglected art. Soil culture is not easy, but, where it is systematically attempted, well repays effort. There is, undoubtedly, a more cheering look-out for the sisal industry, and those plantations which are worked on proper lines are yielding good results. This cultivation is extending and bids fair to be a permanent and promising one for these islands.'

INSECT NOTES.

Grenada.

The following are further extracts from Mr. Ballou's report on his recent visit to Grenada. The subject dealt with is the 'black blight' which is so prevalent in that island. Further information on this pest will be found in the *Agricultural News*, Vol. II, p. 37:—

Black blight is a fungus of the genus *Capnodium*. It finds nutriment and favourable conditions for growth in the secretions of the scale insects and is nearly always to be seen in greater or less quantity on scale-infested trees. As a first cause of injury, it is comparatively insignificant, the damage done to plants attacked by black blight being almost entirely damage by scale insects.

Several trees are always to be seen which show the black blight on leaves and twigs. The most striking of these are: clammy cherry (*Cordia Collococca*), mango (*Mangifera indica*), breadfruit (*Artocarpus incisa*), sapodilla (*Sapota Achras*), guava (*Psidium guava*), lime (*Citrus medica*, var. *acida*), orange (*Citrus Aurantium*).

Black blight also seems able to subsist on the products of several different kinds of scale insects, prominent among which are the following: all the species of the shield scales (*Lecanium*), the glassy star scale (*Vinsonia stellifera*), the mussel scale (*Mytilaspis citricola*), and the mealy shield scale (*Protopulvinaria pyriformis*). Many of the plants affected by these scales, and the attendant black blight, live on year after year, though the upper surfaces of all leaves seem to be thickly coated with the mycelium of *Capnodium*, and the under surfaces and small twigs seriously attacked by scale insects.

No serious attack of black blight, or the scale insects causing it, has yet been observed on cacao or nutmeg, and it may be stated as a general truth that, until the scale insects attack these plants, the black blight will not, and that any observant planter will be able to detect the beginnings of such attack, and by the application of contact insecticides will be able to ward off the attack before it assumes serious proportions. The fact that for so many years cacao has been grown in these islands, where many of these scale insects are native, and has never been seriously attacked by them would lead to the supposition that it is not a favourite food plant for the scales.

Mr. MacNeill, formerly Agricultural Instructor at Grenada, in a letter dated November 1902, gives a long list of plants affected by black blight and says: 'When mangos, breadfruit and other trees become affected with the blight, the crops suffer and I have heard of cases where the trees died;' but he does not say from his own knowledge that black blight does kill trees, or that he has ever seen trees that he considered had been killed by this pest. As bearing on this point, I would refer to the mango. This tree, in many places, is affected year after year by black blight, and yet each new crop of leaves comes on and fully recovers the tree so that with the casting of the old leaves and the bursting of the new, the tree stands to all appearances a clean and healthy tree. Many affected leaves are left, however, and in a short time the scale insects take possession of the new growth and the black fungus soon appears on the leaves which were clean.

When in Grenada, I noticed that the trees in the vicinity of St. Georges were much more commonly attacked by black blight than trees along the leeward coast and in the northern part of the island. What conditions are responsible for this I am not able to say, but I presume that the more unnatural nature of the locality leads to this prevalence.

The extermination of black blight in an island like Grenada would be a practical impossibility. That is to say, the expense of exterminating the various scale insects which furnish conditions favourable to the growth of the black blight would entail an enormous expenditure of money, which would hardly be warranted until the pest gave evidence of being seriously injurious to a valuable crop, and it would necessitate the destruction of so many trees and food plants of the scale insects that the results might be more unfavourable and far-reaching than would be supposed. The control, however, of black blight, and of the scale insects it follows, is, on the whole, a simple matter on any given area.

In conclusion, I would again point out that black blight is unsightly but comparatively uninjurious; the scale insects which it follows may, however, become a serious pest, but they can be controlled.

Entomology in Hawaii.

The Hawaiian Government employs four entomologists who are officers of the Board of Commissioners of Agriculture and Forestry. The chief entomological work is given in the *Hawaiian Forester and Agriculturist* (Vol. I, no. 4, April 1904) as coming under two heads: (1) suppression of insect pests already in the islands, and (2) prevention of the introduction of new insect pests into the islands.

For the former the natural enemies of the various insect pests are depended upon to a large extent. Two of the four entomologists spend a large part of their time travelling in search of natural enemies in the places from which different pests have been imported.

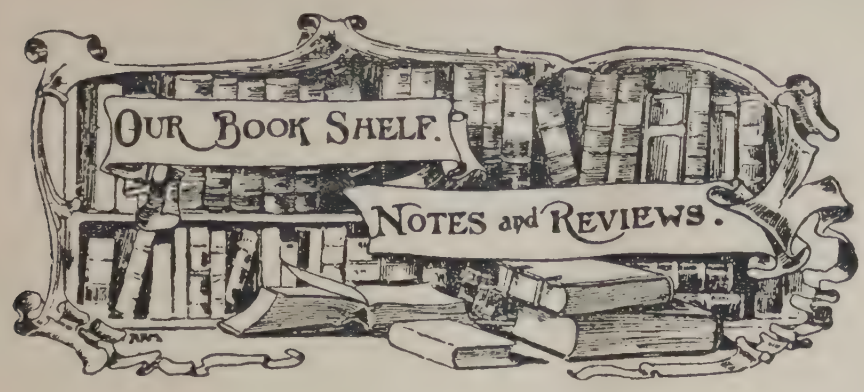
The work under the second head is done by the resident entomologists, who inspect all importations of plants and decide whether they shall be allowed to land, and, if so, whether they shall be treated in order to deal with any insects that may have been found on or among them.

In addition, the matter of spraying and the best cultural methods for dealing with pests attacking the various crops receive a good deal of attention.

At present the leaf-hopper of the sugar-cane is one of the most troublesome pests. Not only does it injure the canes by puncturing the leaves and stems in feeding, and in egg-laying, but in addition these punctures serve to give entrance to fungoid diseases.

The leaf-hopper of the Hawaiian Islands (*Perkinsiella saccharicida*) is closely related to the cane fly (*Delphax saccharivora*) and the corn fly (*Delphax maidis*) of the West Indies, but it is much more serious a pest than the latter. (See *Agricultural News*, Vol. III, p. 154.)

Pickling Lemon and Orange Peel. 'The fruit is cut in half and the pulp extracted. The peel is then thrown into open casks of salt and water and soaked for three days. The water is then drawn off and the peels are packed in layers in barrels. When the barrel is full, it is closed down and salt water is poured in through the bung to fill up completely. When the fruit is saturated the cask is sealed.' (*West Indian Bulletin*, Vol. V, p. 70.)



HOW TO MAKE SCHOOL GARDENS: A manual for teachers and pupils. By H. D. Hemenway, B.S., Director of Hartford School of Horticulture. *New York: Doubleday, Page & Co., 1903.*

This little manual is designed to be of service to those teachers, anxious to take part in the school garden movement, who may not have had the advantage of agricultural training.

It is suggested that in laying out a school garden the aesthetic side should not be lost sight of, but that this should not, on the other hand, be the controlling element. A wise teacher will let the aesthetic and the agricultural elements harmonize. This is the key-note to this book. We hope that the establishment of school gardens in the West Indies will be along the same lines. We have seen school gardens which were really nothing but flower gardens. Something more than this is wanted: they should be miniature experiment plots designed to instruct the children and draw out their powers of observation.

Full directions are given by Mr. Hemenway as to the laying out of the garden and the preparation and fertilization of the land before planting.

Then follow notes on lessons in garden work, instructions being given for planting various vegetables and flowers.

Lessons in greenhouse work deal with such matters as planting seeds, potting plants, striking cuttings, etc. Other lessons deal with grafting and budding.

Although this book deals with the cultivation of temperate plants, there is much in it to recommend its intelligent adoption as a guide by teachers in these islands, who will be able to learn from it the best kind of instruction to give.

SCHOOL GARDENS IN EUROPE: Special Consular Reports issued by the Bureau of Foreign Commerce, Department of State. *Washington: Government Printing Office, 1900.*

This consists of 'reports from Consuls of the United States in answer to instructions from the Department of State' to prepare reports upon 'the founding, progress, and practical working of school gardens in your respective districts.'

Reports are published from Belgium, France, Germany, and Switzerland. Each contains interesting information relating to the nature of the instruction provided, programmes of the courses of instruction, etc.

Excellent photographic illustrations of classes of children engaged in work in the gardens and in the school rooms add to the value of these reports.

In several cases, grants are given by the Government towards the establishment and maintenance of these gardens. In Switzerland a prize of $50 was offered for the best composition on the subject, and the Consul at Aaran furnishes a translation of that which received the prize, which is particularly interesting.

EDUCATIONAL.

Agricultural School, Dominica.

Mr. A. J. Brooks, the Officer-in-charge, reports as follows:—

Since the opening of the school in 1900, eighteen boys have completed their course of instruction and left the school.

All these boys are now engaged in agricultural work in this island.

Eleven are working on estates as overseers, five are working land owned by themselves or relations, two are retained by the Imperial Department at the Botanic Station and Agricultural School.

School Gardens in Grenada.

The following is taken from the annual report of the Inspector of Schools in Grenada just issued:—

It is with satisfaction that I note the completion of thirteen school gardens during the year. These have all been laid out and enclosed from government funds under government supervision. The total cost was about £170, the average size of each being between $\frac{1}{8}$ and $\frac{1}{4}$ acre. A scheme of cash payments in lump sum in connexion with the annual examinations was submitted to the Board of Education, but nothing has since been heard of it. At the annual examinations held October to December 1903, only two schools had really commenced operations, viz., the St. Paul's Anglican and the St. Paul's Roman Catholic schools. Each had made a fairly good start. The gardens have all been established in prominent places, so as to become object-lessons to the people of the labouring classes. Blackie's *Readers* are being more and more extensively used, and the theoretical work done during the year has stood the test of fairly searching examination by the Inspectors. Substantial progress may be expected at the next round of examinations.

If the object-lessons were taught systematically, and the introduction of plant life into the course brought about, the lack of sympathy for the teaching of agriculture that has been so marked would gradually be removed, beginning at the lowest standards of the school.

CAREFUL PREPARATION OF PRODUCTS.

An article in the *India-Rubber World* for June 1, gives some figures to illustrate the bearing of the purity of rubber on its market value. After speaking of the high prices obtained by Ceylon planters for rubber from *Hevea*, compared with the prices obtained for Mexican rubber from *Castilloa*, the writer of the article goes on:—

Para rubber, imported at $1 per lb. with 15 per cent. of shrinkage in cleaning, really costs the manufacturer $1·17½. At the same time Mexican rubber imported at only 75c., with 30 per cent. shrinkage, really costs at the factory $1·07 per lb. The chief explanation of the high prices obtained by the Ceylon planters is that they do not ship dirt to market; the percentage of shrinkage in their product is almost *nil*. Hence when some Ceylon rubber sold recently in London at $1·29¼ per lb., while Central American rubber brought only 81c., this difference alone formed no reason for discouraging the planters of *Castilloa*, which yields the Central sorts. The latter rubber might have brought $1 or more, if prepared as carefully as the Ceylon rubber.

GLEANINGS.

Sea Island cotton seed is on sale at the Botanic Station, Grenada, at 2½*d.* per lb. Application for seed should be made to the Curator.

The annual local agricultural exhibition and show of stock for peasants will be held at Dunscombe plantation, St. Thomas, Barbados, on Tuesday, January 10, 1905.

A cotton ginning plant and baling press, capable of handling a crop of 600 acres, will shortly be put up at Stone Fort estate, St. Kitt's. The plant will be ready for work in October next.

A total of 4,225 lb. of Sea Island cotton seed has been distributed in Jamaica. This should be sufficient to plant about 700 acres. Cotton will be ginned and baled at Hartlands at a charge of 3c. per lb. of clean cotton.

In Jamaica the Island Chemist has made arrangements for supplying thymol, prepared as described in the *Agricultural News*, Vol. III, p. 157, which is recommended for bots and worms in horses, at the small charge of 2*d.* per dose.

The second of the series of lectures on cotton growing in Barbados was given at the Parry School, St Lucy, on Wednesday, July 6. The lecturers were Mr. J. R. Bovell and Mr. L. Lewton-Brain. Owing to unfavourable weather the attendance was only fair.

The *British Bee Journal* gives the approximate number of colonies of bees in various countries as follows :—United States, 4,500,000 ; Germany, 2,000,000 ; Austria, 1,800,000 ; Spain, 1,700,000 ; France, 1,000,000 ; Great Britain, 500,000 ; Holland, 250,000 ; Belgium, 200,000 ; Denmark, 100,000 ; Greece, 50,000 ; Switzerland, 30,000.

According to a *United States Consular Report*, cedar holds a high place among the woods of Columbia, one year's exports of this wood from the two principal ports of the Atlantic amounting to 2,481 metric tons. 'On the Venezuelan border is found the red smelling cedar, called juniper, largely used in the manufacture of lead pencils.'

According to the *Consular Report*, there is likely to be a rapid development in the production of rubber in Indo-China. 'The quantity exported rose from 53 tons in 1899 to 340 tons in 1900, but fell to 266 tons in 1901. The high prices offering have led to a somewhat reckless draining of the sources of supply during the last few years, but regulations are now being enforced to prevent wasteful destruction of plants and to encourage replanting.'

The *Board of Trade Journal* of May 12 gives particulars relating to the manufacture of cocaine in Peru. In 1901, 610,000 kilos. of coca leaves and 10,688 kilos. of cocaine were exported. The average price of cocaine in that year was £30 per kilo.

We are pleased to hear that Mr. E. M. Cutting, the Barbados scholar of 1901, has obtained a First Class, in Botany, in Part II of the Natural Sciences Tripos at Cambridge. It will be remembered that in 1903 Mr. Cutting obtained a First Class in Part I of this Tripos, at the end of his second year at Cambridge.

During the fortnight ended June 16, 301 bales of West Indian cotton were imported into the United Kingdom, sales being effected at the following prices : West Indian, 6·75*d.* to 6·79*d.*; West Indian Sea Island, medium fine, 14*d.*; fine, 15*d.* ; extra fine, 16*d.* per lb. One bale of Barbabos cotton realized as much as 18*d.* per lb. (*West India Committee Circular.*)

A correspondent writes in the Natal *Agricultural Journal* : 'I should like to warn your readers of the absolute necessity of providing bees with a regular supply of pure water during dry weather, otherwise they are likely to seek water in the foulest places. I have found it a good plan to float small pieces of wood in a pan of water, so that the bees can sit on them and drink without danger of being drowned.'

The Rev. Canon Weymouth, writing in the *Journal of the Royal Horticultural Society* on the Hawaiian Islands, refers to the oily nuts of the Indian walnut or candleberry tree (*Aleurites moluccana*), which is not uncommon in the West Indies. He states: 'The natives formerly strung the kernels on bamboo splints and used them as torches. Black polished ornaments are made from the shells.'

Among the recommendations contained in the report of the Committee appointed by his Excellency the Governor-in-Chief of the Windward Islands to consider the expenditure of the balance of the St. Vincent Eruption Fund, we notice the following: 'That a sum of £1,000 be granted to the Imperial Department of Agriculture for the purchase of stock to improve the present breed of animals in the colony and for the housing and enclosure of such stock.'

In his annual Report on the work of the Government Laboratory, Jamaica, for 1903-4, Mr. Cousins reports a visit to a coffee plantation where trees were dying out in certain fields—a state of affairs attributed by the planter to the use of guano as a fertilizer. Mr. Cousins found, however, that the trees were affected by a root fungus and that there was a definite connexion between the roots of dead or decaying Avocado pear trees and the affected coffee. 'This appears to confirm the opinion that the pears should not be grown on any lands intended for subsequent cultivation.'

The report of the Horticulturist of the Canadian Experimental Farms contains a reference to experiments in dust spraying. In dry districts spraying is sometimes difficult owing to scarcity of water. Satisfactory results have been obtained from the use of various machines invented for the purpose. Air-slaked lime has been used in the place of water for carrying the fungicides and insecticides. As a rule the nozzle of these machines is so far away that there is little danger to the operator from the use of arsenical poisons, provided the work is carefully done.

MANURIAL EXPERIMENTS WITH COTTON.

It has been agreed, in consultation with the Hon. F. Watts, B.Sc., F.I.C., F.C.S., that manurial experiments with cotton be carried on in the Leeward Islands. Experiments will therefore be conducted by the Department of Agriculture and cotton planters working together on the following lines:—

The Department of Agriculture will provide the artificial manures for the experiments, and will supervise their application.

The planter co-operating will be required to prepare the land for the experiments and to plant the necessary dividing lines of pigeon peas; to weed and care for the crop during growth, taking all reasonable precautions for the prevention of insect and other pests, including the provision and application of proper insecticides; to gather the cotton from each plot separately, which can be readily done by having as many bags for storing cotton as there are plots in the series of experiments.

When the reaping is completed the proceeds of each plot will be weighed, and ginned, and small samples of lint from each plot sent to the government laboratory for examination and valuation.

The necessary information concerning the weight of seed-cotton, of lint obtained per plot and of the general nature and growth of the crop will be forwarded to the government laboratory for the purpose of preparing the proper report upon the experiments, in a manner similar to that followed in the case of experiments with sugar-canes. It is desirable that care be taken to provide for concise publication of results; fragmentary and piece-meal publication is to be deprecated.

It is proposed that the experiments shall be arranged somewhat on the same lines as those conducted with sugar-canes, and a list of some thirty-five to forty experiments has been drawn up. These experiments are designed to ascertain the requirements of the cotton plant as regards (1) nitrogen, (2) phosphates, (3) potash, (4) salt, and (5) the influence of sulphate of copper. Other experiments, as for example, those with insecticides or fungicides may be added to the series, if local circumstances demand the addition.

Each plot is to be $\frac{1}{40}$ acre, and the plots are to be separated from one another by rows of pigeon peas. Arranged in this manner, each series of experiments will require about $1\frac{1}{2}$ acres.

Little difficulty should be experienced in picking the cotton separately from each plot, if a bag is provided for each plot and plainly marked with the number of the plot. The bags should not be carried about from plot to plot while picking is going on.

The following list of experiments has been put forward as suitable for this year's work:—

1. No manure.
2. Pen manure.

NITROGEN SERIES.

3. No nitrogen, 30 lb. potash, 40 lb. phosphate.
4. 20 lb. nitrogen as sulphate of ammonia, 30 lb. potash, 40 lb. phosphate.
5. 30 lb. nitrogen as sulphate of ammonia, 30 lb. potash, 40 lb. phosphate.
6. 20 lb. nitrogen as nitrate of soda, 30 lb. potash, 40 lb. phosphate.
7. 30 lb. nitrogen as nitrate of soda, 30 lb. potash, 40 lb. phosphate.
8. 30 lb. nitrogen as sulphate of ammonia, 30 lb. potash, no phosphate.
9. 20 lb. nitrogen as sulphate of ammonia, no potash, no phosphate.
10. 30 lb. nitrogen as sulphate of ammonia, no potash, no phosphate.
11. 20 lb. nitrogen as nitrate of soda, no potash, no phosphate.
12. 30 lb. nitrogen as nitrate of soda, no potash, no phosphate.

PHOSPHATE SERIES.

13. No phosphate, 30 lb. nitrogen, 30 lb. potash.
14. 40 lb. phosphoric acid as basic phosphate, 30 lb. nitrogen, 30 lb. potash.
15. 60 lb. phosphoric acid as basic phosphate, 30 lb. nitrogen, 30 lb. potash.
16. 80 lb. phosphoric acid as basic phosphate, 30 lb. potash.
17. 40 lb. phosphoric acid as basic phosphate, no nitrogen, no potash.
18. 40 lb. phosphoric acid as superphosphate, 30 lb. nitrogen, 30 lb. potash.
19. 60 lb. phosphoric acid as superphosphate, 30 lb. nitrogen, 30 lb. potash.

POTASH SERIES.

20. No potash, 30 lb. nitrogen, 40 lb. phosphate.
21. 20 lb. potash as sulphate, 30 lb. nitrogen, 40 lb. phosphate.
22. 30 lb. potash as sulphate, 30 lb. nitrogen, 40 lb. phosphate.
23. 40 lb potash as sulphate, 30 lb. nitrogen, 40 lb. phosphate.
24. 40 lb. potash as sulphate, no nitrogen, no phosphate.

COTTON SEED MEAL SERIES.

25. 3,000 lb. cotton seed.
26. 600 lb. cotton seed.
27. 300 lb. cotton seed, 30 lb. potash, no phosphate.
28. 300 lb. cotton seed, no potash, 40 lb phosphate.
29. 300 lb. cotton seed, 30 lb. potash, 40 lb. phosphate.
30. 300 lb. cotton seed, 30 lb. potash, 40 lb. phosphate, 30 lb. nitrogen.

SALT SERIES.

31. 100 lb. salt alone.
32. 200 lb. salt alone.
33. 100 lb. salt, 30 lb. nitrogen, 30 lb. potash, 40 lb. phosphate.
34. 200 lb. salt, 30 lb. nitrogen, 30 lb. potash, 40 lb. phosphate.
35. 100 lb. salt, 300 lb. cotton seed

SULPHATE OF COPPER SERIES.*

36. 20 lb. sulphate of copper.
37. 20 lb. sulphate of copper, 30 lb. nitrogen, 30 lb potash, 40 lb. phosphate.
38. 20 lb. sulphate of copper, 300 lb. cotton seed.

Note.

Plots nos. 5, 14 and 22, also nos. 8, and 13 are identical, so that one plot, that is, no. 5, will serve 5, 14 and 22, and one plot, that is, no. 8, will serve for 8 and 13.

Stingless Bees. From a commercial point of view, the stingless bees are of almost no importance, at least at the present time. There are several varieties, or, perhaps, more properly speaking, species, in the West Indies, Mexico, Central America, and the South American countries. Some of these bees will store as much as half a gallon of honey in a log; but the great majority of them, if I am correct, work from hand to mouth, just about as the native human beings exist in the same localities. We once had a colony of stingless bees imported from Mexico. Our climate did not seem to agree with them, and they soon dwindled away. While the stingless bees, as their name indicates, have no stings, yet they can bite pretty viciously. One variety is said to be able to 'bite so tremendously' that the average person unfamiliar with the sting of the regular honey bee supposes he has actually been stung. (*Gleanings in Bee Culture.*)

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*See *Agricultural News*, Vol. III, p. 56, 'Rendering Plants immune against Fungus Parasites.'

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London Drug and Spice market for the month of May:—

The same quiet tone reported for April has continued in the drug and spice markets throughout the month of May, and but little change may be expected through the summer months; consequently, there is nothing of any special character to note, and this applies not only to West Indian products but to those of other countries generally.

ARROWROOT.

As an illustration of the effect changes in cultures have, or are likely to have, in different countries, on the several markets, it may be noted that, with regard to arrowroot, the following has appeared in that well-informed and up-to-date journal, the *Chemist and Druggist*:—

'It is said that a considerable number of the proprietors of arrowroot estates in St. Vincent are, in the near future, to devote themselves to the cultivation of cotton, which fact may eventually bring about dearer prices for arrowroot. No supplies were offered at the London auction on Tuesday, May 3, and privately, the market is reported firmer, added to which deliveries during the first four months of the year amounted to 8,068 barrels against 5,487 barrels last year. The stock is now 9,022 barrels, against 11,205 barrels.'

Some proof of the above statement has been shown by the quotation of later prices. Commencing a week after the above statement appeared, good manufacturing St. Vincent realized $1\frac{3}{4}d.$ to $1\frac{5}{8}d.$ per lb., while a week later, 236 barrels were offered and bought in at $2\frac{1}{4}d.$ to $3\frac{1}{2}d.$ per lb.

GINGER.

At the first spice auction of the month over 700 packages of Jamaica ginger were offered and somewhat more than half sold at steady prices, viz., 57*s.* for bold; 46*s.* to 50*s.* for fair to good washed; 39*s.* to 43*s.*, for medium dullish to medium washed, and 34*s.* to 38*s.* 6*d.*, for ordinary to ordinary dullish. Cochin was in slow demand, fetching 25*s.* for shrivelled brown Calicut rough, and 21*s.* 6*d.* for small. A fortnight later, viz., on May 18, as many as 1,300 packages of Jamaica were offered, and about 650 sold at the following rates:—Good washed, 47*s.*; bold, 45*s.*; medium to fair washed, 40*s.* to 44*s.*, small and middling dullish, 36*s.*; ordinary, 34*s.* to 36*s.* 6*d.*, and common dark, 31*s.* 6*d.* to 33*s.* Rough Cochin was quoted at about 2*s.* lower. It may be of interest to note in connexion with the ginger trade, that sales have been effected in Liverpool of the new crop of Sierra Leone at 20*s.* per cwt.

MACE, NUTMEGS, PIMENTO, ETC.

Of other West Indian spices, the quotations at the first sale of the month were as follows:—Mace, fair quality, 1*s.* 9*d.* to 1*s.* 10*d.*; ordinary, 1*s.* 7*d.* to 1*s.* 8*d.*, and pickings, 1*s.* 6*d.* to 1*s.* 7*d.* per lb. A fortnight later the prices had slightly advanced, good West Indian realizing 1*s.* 11*d.*; ordinary to fair, 1*s.* 8*d.* to 1*s.* 9*d.*, and broken, 1*s.* 5*d.*

Nutmegs.—These were from $\frac{1}{2}d.$ to $1d.$ per lb. dearer than in the preceding month, chiefly in the smaller and medium sizes, and these prices remained steady throughout the month.

Pimento.—Of pimento 680 bags of 1901 import were offered at the first sale, greyish to fair quality selling at $3\frac{1}{4}d.$ to $3\frac{3}{8}d.$ per lb. On the 18th. a large quantity of pimento was again offered and disposed of, mostly without reserve, at prices varying but slightly from the above.

Sarsaparilla.—On May 12, 3 bales of genuine grey Jamaica, of common quality, were offered and bought in at 1*s.* 1*d.* per lb. There was a fair supply of native Jamaica, but no fine red was offered: 6*d.* to 11*d.* per lb. was obtained for common mixed to fair red; Lima sold at 10*d.*, and several bales of Honduras were limited at 1*s.* 1*d.* to 1*s.* 2*d.*

KOLA NUTS, ANNATTO SEED, TAMARINDS, ETC.

At the first sale, on the 12th., good West Indian kola nuts sold at $5\frac{1}{2}d.$ to 6*d.*; and two bags of good East Indian, said to be from Ceylon, were disposed of at 5*d.* per lb.

At the same sale, 31 packages of annatto seed were offered and 9 of fair Madras sold at $3\frac{3}{4}d.$ per lb.

At the same sale, 3 bags of ordinary West Indian musk seed were offered and 2 sold at 7*d.* per lb.

Tamarinds were also offered in quantity, good bright Barbados, of new crop, selling at 10*s.* per cwt., in bond; while low stony East Indian sold at 5*s.* A week later, viz., on the 19th., it was announced that the steamship 'Inchmona' from Barbados had arrived with 264 barrels, and the 'Winnie' from Antigua with 217 barrels and 33 half-barrels. The last named vessel had also brought 24 casks of Tonka beans from Trinidad.

West Indian distilled lime oil was quoted at the end of the month at 1*s.* 6*d.* per lb., and new raw West Indian lime juice at from 1*s.* 2*d.* to 1*s.* 5*d.*, according to quality and quantity.

BAHAMAS ISLANDS.

Appointment of Curator of Botanic Station.

A Board of Agriculture has recently been established in the Bahamas, and it is proposed to start a Botanic Station for which a Curator is required. Particulars as to this appointment are contained in the following extract from a letter addressed by the Acting Chairman of the Board of Agriculture to the Imperial Commissioner of Agriculture:—

Believing that a man who has become familiar with the climate, soil and plants of the West Indies would best suit these islands, the Board would be much indebted to you if you would kindly let it become known that such a man is wanted and forward to them, with your indorsement, any applications that may be made.

The candidate is to state his capabilities. The proposed salary is from £150 to £200.

The Board would prefer a practical man with some scientific training, and, as you may suppose, a knowledge of the sugar industry is unnecessary. The Bill appointing a Curator is for a period of three years only, but may be renewed if the experiment is found to be satisfactory; and it is expected that the Curator with reach here not later than October.

It would be well if applications for this post were addressed, in the first instance, to the Imperial Commissioner of Agriculture for the West Indies, Barbados.

Lawn Grasses in Egypt. According to the *Journal of the Alexandria Horticultural Society*, among the grasses most frequently used in Egypt for making lawns are *Stenotaphrum americanum* (the Jamaica pimento grass) and *Cynodon Dactylon* (the Bahama or Devil's grass of the West Indies.) Of the latter it is stated: 'Experience has shown the absolute necessity of obtaining a flat surface before planting, as no amount of earth added after the grass has taken root will have the same effect in levelling up the soil.'

MARKET REPORTS.

London,—June 21, 1904. Messrs. Kearton, Piper & Co., Messrs. J. Hales Caird & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' June 17, 1904; and 'The Public Ledger,' June 18, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
Balata—Demerara Sheet, 2/3; Venezuelan Block, 1/5½ per lb.
Bees'-wax—£7 to £7 7*s.* 6*d.* per cwt.
Cacao—Trinidad, 57/- to 68/- per cwt.; Grenada, 52/- to 58/- per cwt.; Dominica, St. Lucia, and Jamaica, 50/- to 58/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 37/- to 38/- per cwt.
Copra—Trinidad, sundried, £16 10*s.* to £16 15*s.* per ton, c.i.f.
Cotton—West Indian Sea Island, 16½*d.* to 18*d.* per lb.
Fruit—
Bananas—Jamaica, 4/6 to 7/6 per bunch.
Grape Fruit—10/- to 11/- per case.
Oranges—No quotations.
Pine-apples—Antigua, 14/- to 16/- per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, common to middling, 31/6 to 43/-; good fair bright, 46/6 to 48/- per cwt.
Honey—18/- to 30/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/11; Cake, medium, palish, 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/4 to 1/6 per gallon; Concentrated, £13 5*s.* per cask of 108 gallons.
Lime Oil—1/5 to 1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—1/2 to 2/1 per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—140's, 6*d.* to 6½*d.*; 100's, 9*d.*; 57's, 2/3 per lb.
Pimento—3*d.* to 3½*d.* per lb.
Rum—Demerara, 7*d.* to 7½*d.* per proof gallon; Jamaica, 1*s* 9½*d.* and upwards per proof gallon; Leewards, 7*d.* to 10*d.* per proof gallon.
Sarsaparilla—Jamaica, 7*d.* to 1/- per lb.
Sugar—Crystallized, 15/3 per cwt.; Muscovado, Barbados, 11/6 to 13/3 per cwt.; 89°, 9*s.* 1½*d.* on floating terms; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£12 per ton.
Tamarinds—Antigua, 7/- to 8/-; Barbados, 10/- to 11/- per cwt.

Montreal,—June 9, 1904.—Mr. J. Russell Murray. (In bond quotations.)

Bananas—Jamaica, $1·25 per bunch of 8 hands; $1·40 per bunch firsts; $1·65 per bunch Jumbos, c. & f.
Cacao—Jamaica, 11c. to 12c. per lb. c. & f.
Cedar—Trinidad, 45c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $24·00 to $26·00; Trinidad, $21·00 to $23·00 per M. c. & f.
Coffee—Jamaica, medium, 8½c. to 9½c. per lb. c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb. c. & f.
Limes—Jamaica, $6·00 per barrel, c. & f.
Molascuit—Demerara, $1·32 per 100 lb. c. & f.
Molasses—Barbados, 22c. to 25c.; Antigua, 21c. to 22c. per Imperial gallon.
Nutmegs—Grenada, 110's, 17½c. to 18½c. per lb. c. & f.
Pimento—Jamaica, 7½c. to 7¾c. per lb. c. & f.
Sugar—Grey Crystals, 96°, $2·40 to $2 50 per 100 lb. c. & f.
—Centrifugals, 89°, $2·05 to $2·15 per 100 lb. c. & f.
—Molasses, 89°, $1·88 per 100 lb. c. & f.
—Barbados, 89°, $2·25 per 100 lb. c. &. f.

New York,—June 24, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12½c. to 13c.; Jamaica, 10¼c. to 12c.; Grenada, 12¼c. to 12½c.; Trinidad, 12¼c. to 13¾c. per lb.
Cocoa-nuts—Trinidads, $19 to $21 per M., selected. Jamaicas—No quotations.
Coffee—Jamaica, fair to good ordinary, 7c. to 7½c. per lb.
Ginger—Jamaica, 6½c. to 8c. per lb.
Goat Skins—Jamaicas, 52c. to 54½c. per lb.
Pimento—6¼c. to 6½c. per lb.
Sugar—Centrifugals, 96°, 3 31/32c.; Muscovados, 89°, 3 13/32c. Molasses, 89°, 3 7/32c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 29, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—13½c. per gallon (Imperial).
Sugar—$1·85 per 100 lb.

Barbados,—July 2, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·50 to $3·70 per 100 lb.
Cacao—$11·50 to $12·00 per 100 lb.
Cocoa-nuts—$10·75 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $11·00 per 100 lb.
Hay—95c. to $1·00 per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $75·00 to $76·00; Sulphate of potash, $67·00.
Molasses—13c. per gallon (puncheon included).
Onions—Madeira (stringed), $2·25 per 100 lb. ex 'Sarstoon'; Bermuda—No quotations.
Potatos, English—Bermuda, $4·00 per barrel.
Rice—Ballam, $4·50 to $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
Sugar—in hhds., 89°, $1·85 (packages included). Dark Crystals, 96°, $2·20 per 100 lb.

British Guiana,—June 30, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $9·00 per barrel.
Balata—35c. to 40c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$7·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—$4·60 to $4·75 per bag of 168 lb., ex 'Sarstoon.'
Eddoes—96c. per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—$2·00 per 100 lb., ex 'Sarstoon'; Teneriffe, 1½c. to 2c. per lb.
Pea Nuts—Curaçoa, 4c.; American, 5¾c. per lb. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$3·00 to $4·00 per barrel.
Rice—Ballam, old, $4·60; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·20 per barrel, $1·00 per bag.
Tannias—$1·20 per barrel.
Yams—White, $1·68 per bag.
Sugar—Dark Crystals, $2·12½ to $2·17½; Yellow, $2·25 to $2·50; White, $3·00 to $3·50; Molasses, $1·70 to $2·00 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—June 30, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red, $12·10 to $12·25; Estates, $12·25 to $12·45; Venezuelan, $12·60 to $12·80 per fanega (110 lb.).
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—68c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·65 to $2·75 per 100 lb.
Onions—Teneriffe, 80c.; Madeira, $1·25 per 100 lb.
Potatos, English—$1·75 to $2·25 per 100 lb.
Rice—Yellow, $4·20 to $4·50; White Table, $5·50 to $5·75 per bag.
Sugar—White Crystals, $3·25; Yellow Crystals, $2·35 Molasses Sugar, $2·20 to $2·25 per 100 lb.

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(VOL. IV, NO. 4.)

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 60. BARBADOS, JULY 30, 1904. PRICE 1*d*.

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The Agricultural Industries of the West Indies.

IN his lecture to the members of the West India Committee on the 'Agricultural Industries of the West Indies,' Sir Daniel Morris gave an account of the progress of agriculture in these colonies since the inauguration of the Imperial Department of Agriculture. We give the following brief summary of the lecture.

There was among some people an idea that the West Indies were played out or could not compete with other countries on account of want of land: that was altogether erroneous. It was estimated that there were still some 2,000,000 acres of uncultivated land, suitable for bearing crops of some kind. Much of this was not, of course, suitable for bearing large crops of sugar, cacao, bananas, etc., but there were other industries capable of being started on such land, and it was part of the work of the Imperial Department of Agriculture to carry on experiments that would lead to the profitable cultivation of such industries on remunerative lines.

After indicating briefly the more important lines of work in which the Department was engaged, Sir Daniel referred to the sugar-cane experiments. These were devoted to raising new varieties of canes for the purpose of increasing the yield of sugar per acre and of obtaining disease-resistant canes; also to testing the relative values of manures and the most economical methods of cultivation. Altogether there were about 500 acres under sugar-cane experiments in the West Indies A very considerable number of new canes was raised every year. Only very few of these proved worthy of being cultivated on a large scale. The work was still in the experimental stage but was nevertheless full of promise. The area planted in new seedling canes in British Guiana comprised about 13,000 acres. In Bar-

bados and Antigua, owing to the occurrence of disease in the Bourbon cane, seedling and other canes were almost exclusively cultivated. The yield of seedling canes in many cases exceeded that of the Bourbon.

Sir Daniel then briefly sketched the history of the resuscitated cotton industry from the start that was made in 1900 up to the present time, when sufficient seed had been distributed to plant 8,000 acres. The result had been to show that the West Indies could produce as good cotton as the United States. The encouragement of this industry had received special attention from the Imperial Department of Agriculture. There were, he said, fifteen cotton ginneries already established, turning out cotton of high quality. He believed that by establishing a market for a special class of cotton, the Sea Island, the West Indies need have little fear from the competition of other countries, as they could not grow Sea Island cotton and would have to confine themselves to the ordinary class of short-staple cotton.

With regard to subsidiary industries, cacao, rice, fruit, and limes were, next to sugar, among the most important industries. Experiments in the field treatment of cacao and limes were being carried on at Grenada and Dominica. The very extensive fruit industry of Jamaica, which was now worth nearly £1,000,000 per annum, had received a considerable impetus by the establishment of the Direct Line of steamers between that island and the United Kingdom. A serious attempt was now being made to export bananas and other fruit from Trinidad. A very interesting banana industry had lately been taken up in Barbados, where a banana exactly similar to the Canary banana was being cultivated, and a keen demand at good prices had arisen for it. Great care was being exercised in the packing of these bananas and they arrived in excellent condition.

The export of oranges had been carried on in Jamaica on a considerable scale for some time, and now that greater care was being taken in selecting and marketing the fruit, there was no reason why the trade should not be very considerably increased in value. Pine-apples were being produced on a fairly large scale at Antigua. This pine was of good quality and approached in flavour the much esteemed Ripley. For export purposes, possibly the Smooth Cayenne was the best pine of all; this variety was being largely cultivated in Jamaica, and recently good fruit had been grown at Dominica and St. Vincent.

Recent experiments had shown that English potatos could be grown at a profit in the West Indies even to meet local requirements. Arrangements had now been made to obtain seed potatos of the 'Bliss Triumph' variety for planting at the beginning of September. The potatos would then have time to grow before the setting in of the dry season, and they would be the first to come into the market in New York and London.

An onion industry had been carried on for some time in Antigua to supply the New York market. In Antigua onions were grown entirely on the cane banks and received no special attention after they were once planted out. Therefore, whatever money was made from them was pure profit. As the West Indian onions would be placed on the New York market at least a month before those grown at Bermuda, there was an opportunity for a comparatively large trade.

In conclusion, Sir Daniel Morris said that it was impossible that this work should suddenly come to an end. The way to ensure its continuance would be for each colony to supplement the Imperial Grant. It would still be desirable that the administration should be entrusted to the Imperial Commissioner of Agriculture: unless they had a central authority it would be impossible to secure united action, without which they would fail to attain that degree of effort which was necessary for their highest prosperity.

SUGAR INDUSTRY.

Manurial Experiments with the Sugar-cane.

It will be remembered that the manurial experiments conducted by Mr. Watts in the Leeward Islands tend to show that when pen manure is used phosphate and potash are not remunerative either when applied to plants or ratoon canes, nitrogenous manures being by themselves profitable. See *Report on Experiments with Sugar-canes in the Leeward Islands*, Part II, (Manurial Experiments) pp. 8, 52, 102, 103, 106, and 107; also Pamphlet No. 30, *Manurial Experiments with Sugar-canes in the Leeward Islands*, pp. 55-62.

These conclusions are supported by the following remarks taken from a paper on 'The Sugar Industry in Java' by H. C. Prinsen Geerligs (*International Sugar Journal*, June 1904, p. 283):—

> The sugar-cane manure exclusively used in Java is a nitrogenous fertilizer; potash and phosphoric acid, which are missed in no fertilizing mixture, find no application here, as numerous experiments made at the experiment stations in Java have shown they do not improve the quantity or quality of the cane manured with them. It must be observed that I am now speaking of Java only, and of cane planted on land which bears two rice crops on irrigated land between two cane crops.

Cane Farming in Nevis.

We published in a previous issue of the *Agricultural News* (Vol. II, p. 226) particulars as to proposals for utilizing an additional Imperial grant of £1,000 in aid of peasant cultivation in the island of Nevis.

It will be remembered that the arrangement was for muscavado mill owners, in consideration of a grant to be paid to them by the Government, to undertake to purchase canes from peasant proprietors and to pay for the same according to a sliding scale depending upon the net local value of muscovado sugar per 100 lb. We are pleased to be able to record that the proposals have met with considerable success, some factories having purchased a much larger quantity of canes than their agreements required.

These arrangements were mainly the outcome of suggestions submitted by the Hon. F. Watts, who writes as follows:—

The proposals appear to have worked well and have proved useful in tiding the struggling sugar industry of Nevis over a very bad time.

Among the important results following are the increased knowledge of the quantity of cane produced from a given area of land, and of the quantity of cane required to produce a ton of sugar. This knowledge cannot fail to lead to improvements both in the field and in sugar manufacture.

The adoption of the plan of selling canes by weight has been to the advantage of both buyer and seller, by doing away with the troublesome and wasteful share system under which each person's cane was separately manufactured into sugar and the produce shared.

Sugar and Molasses in Porto Rico.

The following extracts, taken from the *Consular Report* on the trade of Porto Rico for 1903, give an interesting statement of the condition of the sugar industry in that island :—

The area of sugar-cane cultivation is increasing, but not so rapidly as Porto Rico's favourable position with regard to the certain and free United States market over other sugar-producing areas would seem to justify, even in view of the possibilities of the United States reciprocity with Cuba.

The crop for 1903, as estimated in my last report, was almost accurately realized, viz., 105,000 tons, and these figures it is thought will be exceeded by some 20 per cent. this year.

The crops for the last three years are as follows :—

Year.	Quantity.	
	Sugar.	Molasses.
	Pounds.	Gallons.
1900-1	137,817,470	2,848,314
1901-2	183,822,636	3,080,132
1902-3	233,070,000	3,537,000

DISTRICT OF PONCE.

The general yield of sugar was a disappointment; fortunately, prices were fair and helped somewhat.

This district produces about one-fourth of the whole island crop, and as soon as the central factories turn out their full capacity it will figure still higher : the value of the exports during 1903 amounted to £347,000; in 1902, £241,000. This increase is due to Guanica Centrale making its first crop.

The first crop from Guanica Centrale was a disappointment as only about 10,000 tons were produced. Prospects for next year are better, and they expect to make 25,000 tons, about one-quarter from their own canes, and the balance from planters' canes.

As almost all suitable cane lands are being put into cultivation, their next crop promises to be a large one. The Centrale's actual grinding capacity is about 1,800 tons of cane per day, and this could be increased without great difficulty.

The system of discharging the cane cars by means of electric cranes is a specially noteworthy feature and has proved quite a success.

The company owns 16 miles of 1-metre gauge railroad, 200 cars of 12 to 15 tons capacity, and four 40-tons capacity Baldwin locomotives. The American Railroad Company has acquired 150 of the same cane cars; there are thus 350 of these cars used in the transportation of canes.

The company has a big electric plant for supplying power to the factory and to eight irrigation stations, where electric-driven, Root centrifugal pumps are used.

Nine Stirling boilers are installed with a total of 4,000 horse-power.

After the usual difficulties during the first crop in such large enterprises, the company seems to be working now with a brighter future.

Molasses is decreasing in the district owing to less muscovado sugars being made. The exports were of the value of £45,344 in 1903, and £69,995 in 1902.

DISTRICT OF MAYAGUEZ.

The crop of sugar exported from this port during the year under review was about 7,750 tons, showing a falling off of nearly 1,000 tons as compared with the previous season of 1902, while that of molasses reached 622,757 gallons.

The Guanica Centrale Factory, which lies within the Ponce district, has made arrangements with several sugar planters of this district to grind their canes there, so that although next crop's production of sugar here will probably be larger, there is bound to be a considerable falling off in the produce to be exported from this port, and a little reduction in the quantity of molasses to be shipped during 1904 in consequence of so many small planters changing their muscovado to the centrifugal system employed by the Centrale Factory.

The change cannot but be beneficial to sugar planters of the district with canes within reasonable distance from the railroad between this city and Ponce; but the community in general, and particularly the great number of labourers who depended on the local sugar estates, will be losers.

DISTRICT OF ARECIBO.

The production of sugar has not been so satisfactory as was expected, considering the increased plantations in this district. The exports, all to the United States, show a decrease, partly owing to the lack of crushing facilities in certain sections of the district; the canes are sent out and the sugar exported through the port of San Juan.

Since the erection of modern sugar factories the production of molasses for export has ceased; only low grades suitable for alcohol are obtainable here.

WEST INDIAN FRUIT.

WEST INDIAN FRUIT IN LONDON.

We extract the following from the *West India Committee Circular* of July 5:—

A feature of the banquet given by Mr. Lyttelton at the Colonial Office on the occasion of the celebration of the King's Birthday, on June 24, was a selection of West Indian fruit, presented by the Imperial Commissioner of Agriculture. This consisted of a fine bunch of Barbados bananas, and a selection of Smooth Cayenne pine-apples grown in the island of Dominica. The Barbados bananas are a special sort and are sent over carefully packed in cotton wool in wooden crates. The flavour is said to be superior to that of any other bananas that reach this country.

The pine-apples were greatly appreciated and their commercial value is shown by the fact that Messrs. George Monro, Ltd., who recently sold two crates, reported that it was the best fruit they had so far received from the West Indies, and that if similar fruit, carefully packed so as to protect both the crown and fruit, were regularly shipped from the West Indies, a good trade might be done in them. Of the first consignment, above referred to, every fruit arrived in excellent condition and fetched an average net price of 4*s*. each.

At the dinner given in his honour by the West Indian Club on June 22, Sir Daniel Morris presented a fine sample of litchi fruit from the West Indies. This is a native of China and is highly esteemed, possibly next to the mangosteen, for flavour and delicacy. So far, the litchi has not been exported from the West Indies, although fine large trees are to be found in some of the islands. The fruit successfully brought over by the donor was grown under the care of Mr. J. H. Hart, F.L.S., at the beautiful Botanic Gardens at Trinidad. Mr. Hart mentions that this is only the third time in seventeen years that the Trinidad trees have fruited. Possibly by a system of skilful control and irrigation the trees may be induced to become more prolific and produce regularly large crops of one of the most delicious fruits of the tropics.

GATHERING PINE-APPLES.

With regard to the article on 'Gathering fruit for market,' reprinted in the *Agricultural News* (Vol. III, p. 212) from the *Bulletin of the Department of Agriculture*, Jamaica, Mr. J. H. Hart, F.L.S., writes from Trinidad as follows:—

The recommendations of the writers in reference to pine-apples are contrary to my experience.

They write: *Do not cut the stems but break off each close up to the base of the fruit.*

I should advise:—

Cut the stems carefully close up to the base of the fruit, in the same way as oranges are treated, and do not break out the stem as it is apt to cause injury to the fruit and cause rapid decay.

As this is a point in regard to which opinions of practical men appear to be contradictory, it would be of interest if pine-apple growers would give the results of their experience in this connexion.

CONSUMPTION OF BANANAS IN THE UNITED STATES.

The *United States Monthly Consular Reports* for March 1904 gives the following statistics showing the value of bananas declared for export to the United States during the fiscal years ended June 30, 1902 and 1903, respectively:—

Country.	1902.	1903.	Increase.
British Honduras ...	$115,803	$129,512	$13,709
British West Indies	$3,390,230	$3,904,341	$514,111
Colombia	601,072	635,200	34,128
Costa Rica	1,616,195	1,956,805	340,610
Dominican Republic	94,617	97,500	2,883
Guatemala	83,433	91,870	8,437
Honduras	749,681	1,097,066	347,385
Nicaragua	446,006	842,220	396,214
Total ...	$7,097,037	8,754,514	1,657,477

To Refine Bees'-wax. Melt the wax in a jar, and put into it powdered nitrate of soda (Chili saltpetre) in the proportion of 1 oz. to 1 lb. of wax. Afterwards add, by degrees, 2 oz. to 1 lb. of sulphuric acid, diluted with ten times its weight of water, keeping the wax warm, and stirring the while. Let it stand a short time, and then fill up the jar with hot water and allow the whole to cool. The wax should then be white. Afterwards wash with water to remove any nitric acid which may remain, as it would make the wax yellow. There is a slight difference observable in the quality during refining or bleaching. (Queensland *Agricultural Journal*.)

COTTON NOTES.

Cotton from St. Lucia.

Reports have recently been received from the British Cotton Growing Association upon two samples of cotton forwarded from St. Lucia through the Imperial Commissioner of Agriculture.

The report on a sample of Upland cotton was as follows:—

Clean, bright, well prepared. 'Fully good middling' in grade. Staple equal to moderate extra American in length, but rather lacking in strength and regularity. Good useful cotton. Value, 7·20*d.* to 7·30*d.* (Value middling American, 6·72*d.*)

The second sample—one of Sea Island cotton—was reported upon as follows:—

Clean, bright, well prepared. Lacking in length and coarse. Value, 10*d.* (small black seed).

Shipment of West Indian Cotton.

We desire to draw the attention of cotton growers to the following important announcement made in the *West India Committee Circular*. It is only by giving careful consideration to such points as those referred to that it can be hoped to attain ultimate success with the cotton industry:—

With reference to the shipment of Sea Island cotton from the West Indies there are two points, we are informed by the Imperial Commissioner, that require to receive special attention. The first of these is the packing. This is generally much too loose, and in consequence, the freight rates for next season may have to be raised. It is well known that Sea Island cotton will not bear the heavy pressure that is employed for compressing short-staple cotton, but there is no doubt that the West Indian Sea Island cotton will stand, without injury, much greater pressure than is used at present, and it would be in the interest of the growers that this should be borne in mind. The next point is that to obtain the best prices for West Indian Sea Island cotton it should be consigned, for the present at least, to the British Cotton Growing Association. The Association, through its brokers, has established a special market for West Indian cotton, and the high prices now ruling are obtainable only where the shipments are placed in the hands of firms who make a specialty of this class of cotton, and who have the confidence of manufacturers who require long-staple cotton of the best quality. The shipment of small independent lots of West Indian Sea Island cotton is therefore to be deprecated as calculated to injure the industry.

Cotton Seed Oil in Austria.

The following note appeared in the *United States Consular Reports* for March 1904:—

The imports of cotton seed oil from the United States decreased from 161 metric tons in 1901 to 120·4 metric tons in 1902, in consequence of the great increase in price of this article. Cotton seed oil is used extensively here as a table oil, but the prices at which it has been held during the past two years have placed it beyond the reach of the poorer classes and cheaper oils took its place to some extent.

Attempts have been made to import the raw material and produce cotton seed oil in Austria, but all such attempts have failed because the cotton seed suffers by the long sea voyage and the quality of oil produced therefrom is greatly inferior to the American product. Experiments made with Egyptian cotton seed, which does not seem to undergo chemical changes during the comparatively short journey from Egypt to Austria, have shown that it is not fit for the manufacture of edible oil.

Furthermore, it is not at all probable, if the cotton seed oil industry were undertaken here, that a profitable market could be found in Austria-Hungary for the oil cake, which is so important a by-product of the cotton seed oil industry, inasmuch as its yield constitutes from 85 to 90 per cent. of the raw material. Serious doubts must therefore be expressed whether the proposed imposition of a prohibitive import duty on cotton seed oil would in the long run accomplish its purpose.

A BACTERIAL ROT OF ONIONS.

In Barbados, during the past season, onions have been attacked by a rot, which affects the inner scales of the bulb. It was generally noticed after the onions had been gathered and stored.

Microscopical examination of the diseased scales showed that they were swarming with countless numbers of motile bacteria. No traces of fungus hyphae were to be found. It seemed probable that the bacteria were the immediate cause of the rot, and that their development had been favoured by moist conditions, either while the onions were growing or when they were being gathered or dried. The weather during last December, January and February was exceptionally moist in Barbados. It was noticed that in most cases the rot had apparently started at the collar.

Inquiries were made of various persons who had practical experience in onion growing. Their replies, in nearly every case, attributed the disease to the wet weather while the onions were growing and ripening. In one case it was suggested that the rot followed attacks of onion thrips.

An epidemic of a similar, if not the same, bacterial disease caused great loss to onion growers in New York State in 1898. It was made the subject of an investigation by Mr. F. C. Stewart, the Botanist to the New York State Experiment Station.

It was found that, although the rot was quite certainly due to bacteria, it could not easily be conveyed to healthy plants by inoculation, except in the presence of water. It was shown that the unusually large amount of rot in 1898 was due to the excessively wet weather which occurred in July and August of that year.

The only means of prevention are to keep the onions as dry as possible both in the field and in storage, and to keep the cultivation as clean as possible.

KAOLIN IN ST. KITT'S.

The late Dr. Haven, United States Commercial Agent at St. Kitt's, reported last November on kaolin deposits in the island.

Samples of the kaolin taken from a bank deposit at Ottley's estate, were sent to Professor John Clark, of Glasgow, who reported: 'The results of my analysis indicate that this is kaolin, or China clay, and I am of the opinion that it is of sufficient purity for pottery purposes.'

Dr. Haven stated that there seemed to be a large deposit of this kaolin, which is covered by 3 or 4 feet of the red clay such as is much used in the adjacent island of Nevis for making water jugs, pitchers, etc., which being porous are employed as coolers.

RABBIT KEEPING IN THE WEST INDIES.

The following is a further instalment of Mr. J. Barclay's notes on rabbit keeping:—

HOUSING.

The hutch set on four posts, 4 feet from the ground, is the best for our conditions in general. This prevents strange dogs getting at the rabbits, and cats and rats are kept off by putting a sheet of tin round the posts the same way as is done with cocoa-nut trees. I have not much sympathy with the people whose house-dogs and cats are not to be trusted to run with the rabbits. On estates where there is some privacy and a good expanse of green pasture (common), what is called the Morant system, with boxes placed here and there around the house, is by far the best way of keeping rabbits, as the boxes may be shifted on to fresh grass daily; and if the dogs are trained to protect, rather than molest, the rabbits, these can be allowed liberty to run in and out of the boxes as they please. The Morant system consists simply in providing a long box for the rabbits placed on the ground. This is divided into two, either open at the bottom, or with wide mesh wire to keep the rabbits from scraping (though Belgian hares are not given much to scraping). One division is closed round and with a box in it, meant for a breeding nest; the other with mesh wire all round, the top of the former being sloping, in the form of a lid, with hinges, so that it may be lifted up, and it is thus easy to get at the rabbits. For most circumstances in the West Indies, however, the raised hutch will be the only kind of housing convenient.

The following description, taken from the *Journal of the Jamaica Agricultural Society* for July 1903, is written by an experienced rabbit keeper:—

'Hutches may be of any convenient shape, as large as can be afforded, with high roof well over-hanging to give shelter from driving rain. Three sides may be wired (1-inch wire) and one boarded for protection from wind. A board placed securely as a shelter, about 14 to 16 inches above the floor and 12 inches from the roof, on to which the rabbits can jump, is a great addition to their comfort, and gives exercise, besides providing a snug retreat out of wind and light, where they can retire to sleep during the day. A box put in the hutch is not so good, as most rabbits will prefer to lie stretched out on their high shelf, which is cooler. But whatever the style of hutch, the floor should be of wire-netting ($\frac{1}{2}$-inch mesh) which will ensure a dry, clean house. The wire left bare would be injurious to the feet of the rabbits, and to avoid this a plentiful supply of dry hay-grass (or dried Guinea grass, if the other is not to be had) must be spread all over the floor. The rabbits will feed heartily on this when it is put in fresh every morning. The hutches should be placed on posts at least 3 feet above the ground, and occasionally a layer of fresh earth should be spread under them as a deodorant. They should stand in a sheltered, well drained position under trees. Some sun should reach the rabbitry to keep it dry and healthy, but rabbits cannot stand much sun.

'All the woodwork of the hutches should be painted inside and out with tar thinned with a little kerosene oil and laid on while boiling hot. This soon dries in and should be renewed every few months. The hutches should be tarred in rotation, removing their inmates for two or three days until the tar is dry. This is a preservative to the wood, keeping away insects and preventing the rabbits from gnawing. Any part of the hutch that is soiled should be wiped out daily with a cloth, wrung out of some weak disinfectant, Izal preferably, as it is non-poisonous.

'Hutches for nurseries should be more snug than those intended for half-grown or mature stock. They should be furnished with a comfortable nest box, about 18 inches long, by 12 inches high, and 12 wide, with one opening 4 inches above the level of its floor, made like that of a pigeon cote.'

In one locality, where there was a stretch of green sward, the writer kept his Belgian hares running free, having trained the dogs not to meddle with them. To prevent the animals from becoming wild, they were driven into their boxes occasionally and kept in for a few days at a time, being then let out only night and morning for fifteen minutes or so. They would all scamper to their house at a clap of the hands.

In another locality, high and cool, the house is a hutch of the ordinary kind used by the people, with wattled sides and with a thatched roof, the back, turned towards the prevailing wind, being thatched also. This hutch is erected in a poultry run, which has a wattled fence around it, and the hares are let out occasionally for short runs.

YIELD OF CACAO IN DOMINICA.

In the following extract from his annual report on the Botanic Station at Dominica, the Curator (Mr. J. Jones) gives the yield of cacao from the experiment plots and makes interesting observations as to the relative yields of wet and dry (cured) cacao:—

The area under experiment is $1\frac{3}{4}$ acres. Besides the cacao trees there are growing on this land six large trees of *Castilloa elastica*, six nutmegs, and some fruit trees. The total yield from the five plots in wet cacao for 1903 was 5,352 lb. After careful experiment it is found that at this station 100 lb. of wet cacao give $42\frac{1}{2}$ lb. of dry or cured cacao. The yield from the plot in cured cacao is, therefore, 2,274 lb. (20·30 cwt.), or at the rate of 11·60 cwt. per acre, for the year ending June 1903.

The total cacao crop at the station for the year mentioned was 50 cwt.

For the year ending June 1904, the total yield from the five plots was 4,026 lb. of wet cacao. This is equal to 1,701 lb. of cured cacao (15·18 cwt.), or at the rate of 8·67 cwt. per acre. The total crop of cacao at the station this year was 44 cwt. The fall in the crop was probably due to unfavourable climatic conditions.

In some islands, wet cacao is calculated to give half its weight as cured cacao. This is a high estimate, but it can, no doubt, be obtained, if the cacao pods are all allowed to remain on the trees until quite ripe. The beans are then comparatively dry, as the mucilage surrounding the seeds, which is so abundant before the pods are quite ripe, disappears to a considerable extent. The loss during the fermenting and drying process from thoroughly ripe pods is much less than from cacao pods less ripe. In Dominica, owing to the prevalence of praedial larceny, much of the cacao is gathered before it is as ripe as it should be, hence the return per 100 lb. of wet cacao cannot be placed higher than 42 lb. In these experiments the beans are weighed immediately after breaking the pods. If cacao beans were allowed to drain for twelve to eighteen hours after breaking, and then weighed, the proportion of cured cacao per 100 lb. of wet would be higher.

DOMINICA AGRICULTURAL SCHOOL.

Extracts from Ledger kept by a Pupil.

The following are extracts taken from the ledger kept by a pupil of the Agricultural School at Dominica. It will be seen that each boy keeps an accurate record of the work done in the carrying out of each experiment:—

SWEET POTATO EXPERIMENT.

Area, 900 sq. feet, or $\frac{1}{48}$ acre, approximately.

Previous crop.—Onions and cabbage. The land was, however, resting for a considerable time. Number of banks, 16.

Preparation of land.—November 26, 1902.

The land was staked off at 3 feet apart at each of the long sides. The line was stretched and the land hoed up into banks 2 feet high.

Preparation of cuttings.—November 26, 1902.

Good, healthy potato vines were selected for making cuttings. From these, cuttings 9 to 12 inches long were made by cutting these just below a node and taking off the lower leaves, that is, the portion of the cuttings which are to be buried below the soil.

Planting.—November 26, 1902.

The cuttings were planted 9 to 12 inches apart on the banks. The method adopted was to make the holes with a 'dibbler,' then put in the three lower nodes of the cuttings and draw the soil firm around them. Two rows of cuttings were put on each bank.

After-cultivation.—The weather being wet, the cuttings came on rapidly, and soon covered the banks. The weeds were thus kept down, and the plot was only weeded once—the first week in January 1903.

Reaping and results.—The vines were cleared off and the potatos dug on March 25, 1903—four months after planting. They were forked out, weighed, and stored up in a house after being lightly cleaned of the soil.

The crop from the 100 sq. yards was 288 lb. of potatos in all, that is, a return of 6·25 tons per acre.

Value of crop at $\frac{1}{2}d.$ per lb.	12*s.* 0*d.*
„ „ per acre	£29 0*s.* $9\frac{1}{2}d.$

WHITE BEAN EXPERIMENT.

Preparation of land.—December 12, 1902.

The potato banks that were in the plot were levelled down with the hoe. As by this means the soil was already quite loose, no forking was done. The land was afterwards levelled with the rake.

Planting.—December 12, 1902.

The land was staked off 2 feet apart along the long sides, and the line stretched between opposite stakes. Holes were made about 3 inches deep and 3 inches apart close to the line, and two beans planted in each hole and covered over. The soil being very loose was trampled down firm over the holes. The plot was then raked over.

After-cultivation.—On January 14, 1903, the cultivator was passed between the rows of beans to cut off weeds and stir up the soil. At the same time the beans were hilled up by drawing up the soil on both sides to about 6 inches high around the plants. On January 22, the beans that were not hilled up on the first occasion were now done up.

Reaping.—The beans were allowed to dry on the plant before being picked. The first picking took place on February 21, when $9\frac{3}{4}$ lb. of cleaned beans were got.

The second reaping took place on March 3; the plants with the beans on were pulled out and put in the drying house. The total weight of beans got was $13\frac{3}{4}$ lb. Of these 12 oz. mildewed.

YAM BEAN EXPERIMENT.

Previous crop.—Plantains with bonavist peas between. Number of banks, 15.

Preparation of land.—The land was pickaxed some time in March, and left in that condition.

June 8, 1903. It was on this day gone over, and the lumps made fine, after which banks 4 feet wide were made.

Planting.—June 9, 1903. Holes about 3 inches deep were made at 2 feet apart on the tops of the banks and two seeds were put in each hole. The rainy season had just set in.

EXPERIMENT ON DESTROYING TICKS ON A COW.

A cow at the school being affected with ticks was treated with a strong preparation of kerosene emulsion which was made and applied as under:—

Preparation of kerosene emulsion.—(Stock Solution) May 26, 1903.

Half a kerosene tin of water was put on the fire to boil. When boiling about 2*d.* worth of soap was put in and stirred until it had quite dissolved. The tin was then taken off the fire and one quart of kerosene was immediately added to it, the whole being well stirred up at the same time, to get the kerosene well mixed up with the soap solution.

Vigorous stirring was then kept up for some time, until the mixture became white and creamy.

Application.—The emulsion was mixed with water in the proportion 1:2 and the whole well mixed together. It was then sprayed on the cow with a 'Knapsack sprayer' and rubbed on to her with the hand. This was continued every five or seven days until she was free of the ticks.

POULTRY NOTES.

The Water Supply.

We reproduce below (fig. 9) an illustration of a simple little contrivance for the poultry yard.

The illustration is taken from the *Senior Country Reader, III*, which is reviewed on p. 251.

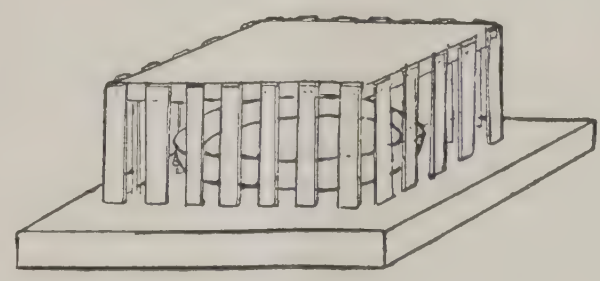


Fig 9. PLAN FOR KEEPING THE DRINKING WATER CLEAN.

It represents an inexpensive and easily made arrangement for keeping clean the water supplied to fowls for drinking purposes. The fowls can put their heads through between the laths and drink from the pan without dirtying the water. This plan might also be adopted where skimmed milk is fed to poultry.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 223 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, JULY 30, 1904. No. 60.

NOTES AND COMMENTS.

Contents of Present Issue.

A brief summary of Sir Daniel Morris' lecture to the members of the West India Committee on the 'Agricultural Industries of the West Indies' will be found on p. 241.

Under the heading 'Sugar Industry' are notes on manurial experiments, on the cane-farming industry in Nevis, and a statement of the condition of the industry in the neighbouring island of Porto Rico during 1903. Special reference is made to the first year's operations at the Guanica central factory.

Our 'Cotton Notes' contain a report on samples of cotton from St. Lucia and an announcement, relative to the shipment of cotton from these islands, made in the *West India Committee Circular*.

Mr. Barclay's rabbit notes are continued on p. 246. The subject of this instalment is the proper housing of rabbits.

In a former issue of the *Agricultural News* we stated we should publish extracts from one of the ledgers kept by boys attending the Agricultural Schools. These extracts will be found on p. 247.

The short account of a successful school garden in St. Lucia, given on p. 251, is likely to be of interest. On the same page we publish a note relating to an agricultural apprenticeship scheme which is to be put into operation in British Guiana.

Short reviews on the recently issued annual reports of the Botanic Stations at British Honduras and Trinidad will be found on p. 253. On the same page are interesting notes on onion cultivation and the prospects of a West Indian trade.

Botanic Station Reports.

The first of the annual reports on the West Indian Botanic Stations, Agricultural Schools, etc., for the year ended March 31, 1904, viz., that for Dominica, has been published and is being distributed by this mail.

It is expected that the reports for St. Lucia and Montserrat, which are now in the printers' hands, will be ready for distribution by next mail.

The report for St. Vincent is also in the press, and will shortly be published.

The Onion Industry.

In this issue of the *Agricultural News* we publish several short articles on the onion industry in the West Indies.

A very brief account of a bacterial disease, which caused considerable damage to onions in Barbados last season, is given on p. 245. A full account of this disease, methods of prevention, etc., has been prepared and will appear in the next issue of the *West Indian Bulletin* (Vol. V, no. 2).

Further notes on onion cultivation will be found on p. 253: these include details as to yield, etc., of an experiment carried on in Jamaica, and an interesting letter from British Guiana giving certain hints that should be valuable to growers and shippers who are desirous of supplying British Guiana.

West Indian Fruit in London.

We learn from the *West India Committee Circular* that a large silver medal was awarded to the exhibit of West Indian fruit at the Horticultural Exhibition held at the Botanical Gardens from June 6 to 11. The arrangements of this exhibit were carried out by the West India Committee.

A large exhibit was sent by the Royal Mail Steam Packet Company and comprised bananas, grape fruit, limes, mangos, oranges, pine-apples, and sapodillas. There were also exhibits of Antigua pine-apples, Jamaica bananas and grape fruit, as well as a fine show of fresh limes and lime products lent by Messrs. L. Rose & Co., Ltd.

In this connexion mention might also be made of two crates of pine-apples from Dominica, which were taken to England by the Imperial Commissioner of Agriculture. These pines were grown at the Botanic Station, Dominica, from suckers imported from Jamaica. As will be seen from the following report, from Messrs. George Monro, Ltd., of Covent Garden Market, these pine-apples arrived in excellent condition and fetched good prices.

The brokers' report was as follows:—

'Your pines came to hand and are better in quality and condition than any we have as yet received from the West Indian Colonies. I enclose our sale and think if they would be careful to send only selected fruits, carefully packed to protect crowns as well as fruits, and sent in *cool* chamber, *not frozen*, there might be a trade to be done.'

From the account sales we learn that the sixteen pines fetched £3 4*s*. 3*d*., an average of 4*s*. each.

Government Laboratory, Jamaica.

We have received a copy of the annual report of the Island and Agricultural Chemist in Jamaica for the year ended March 31, 1904.

Out of a total of 485 samples (exclusive of plants for fumigation) dealt with during the year, 310 were classed as 'Agricultural.' The small proportion of police and customs samples enabled the chemist to devote most of his time to agricultural problems.

The results of most of the agricultural analyses and investigations have appeared in the *Bulletin of the Department of Agriculture*, and have been noticed from time to time in the *Agricultural News*.

Reference is made to the work of Mr. C. Allan, B.Sc., who was appointed Fermentation Chemist during the year. Mr. Allan has visited a large number of estates, studying local conditions and taking samples for work in the Laboratory.

Grasses and Cattle in the Danish West Indies.

In a report, dated November 20, 1903, the United States Consul at St. Thomas states that it is remarkable to find so many fine cattle as exist among the native herds in the Danish West Indies, considering they feed only on the native grasses.

The grasses most popular for cultivated pastures are Guinea grass and 'Spanish grass,' by which name, we believe, Para grass is known in some parts. Although the former is more often grown, probably on account of its stronger and more rapid growth, herdsmen are not able to state which is better for the cattle. Possibly the Spanish grass is better able to withstand drought, and it is remarkable how quickly the pastures are renewed after the rain begins to fall.

The only drawback to the establishment of a stock-raising industry appears to be the occasionally protracted dry season. Investigations are, however, now being carried out with a view to the introduction of an irrigation system.

Agriculture in the Falkland Islands.

In these islands agriculture is practically confined to sheep rearing. According to the *Annual Report* for 1903, the estimated number of sheep on the farms was 681,209. The exports of wool during the year were of the value of £103,597 ; of sheep-skins, £7,450.

It is reported that most of the farmers are endeavouring to improve their flocks by selection and the importation of new blood. During the year 515 sheep were imported from New Zealand, Romney Marsh rams being most favoured for the purpose.

The great pest of the farmers is the so-called 'wild' goose. 'It is represented that from 100,000 to 150,000 (representing grass for 20,000 sheep) might, with advantage to the sheep farmers, be destroyed annually.' Ten shillings per 100 is the price paid for the upper beaks of these birds as evidence of their slaughter.

His Excellency the Governor does not sympathize with these efforts and is of opinion that, as the Falkland Islands goose is excellent eating, some scheme might be devised for preserving the food and marketing the high-class down.

Oil of Ben.

We published in the *Agricultural News*, Vol. III, p. 150, a short note on oil of ben, in which reference was made to an examination of this oil by the Director of the Imperial Institute.

In an article on the 'Nature and commercial uses of Ben Oil' in the *Bulletin of the Imperial Institute* (Vol. II, no. 2), reference is made to examinations of samples from Northern Nigeria and Jamaica.

The seeds, which were identified as those of *Moringa pterygosperma*, received from Northern Nigeria, contained 38 per cent. of an almost odourless, pale-yellow oil, possessing a bland, agreeable taste. Brokers to whom the oil was submitted reported that the oil would probably be able to compete for edible and culinary purposes with American refined cotton seed oil, which is at present worth about £22 per ton. The seeds were valued at about £7 per ton delivered in London. The sample of ben oil received from Jamaica in December 1903 was found to have a very slight, pleasant odour, and an agreeable taste. The results of the chemical examination are given.

It is pointed out that in arriving at the cost of production, which appears very large, the manufacturers in Jamaica appear to have made no allowance for the residual cake which might be of value as a cattle food.

Castor Oil Plant in Ceylon.

The *Annual Report on the Royal Botanic Gardens*, Ceylon, contains an interesting account of experiments conducted at the Experiment Station with different varieties of the castor oil plant. Varieties were obtained from Calcutta, Madras, Colombo, and Hakgala.

The Calcutta variety grows to a larger tree than any of the others. The crop is ready for reaping in four to five months after planting at stake, and a month later if the seedlings are transplanted. The yield was at the rate of 152 lb. of seed per acre. This variety, however, is not recommended for cultivation on account of its liability to the attacks of a green fly.

The Madras variety, of much smaller habit, resisted, to some extent, the attacks of the fly. It bears fruit somewhat earlier than the preceding variety. The yield was at the rate of 4½ cwt. of seeds per acre, and it appears to be one of the best varieties of the castor oil plant.

The Colombo ('Patna') variety comes between the two preceding varieties in point of habit. The crop can be expected four to five months after sowing. The yield was at the rate of 3 cwt. of seed to the acre.

The fourth kind, known as 'Major,' is a perennial variety. It is a large, quick-growing variety, but was completely defoliated by the previously mentioned fly. The yield of seeds was at the rate of 354 lb. per acre.

Of all the varieties the Madras suffered least from the green fly. An effective remedy for this insect pest was found in Macdougal's mixture.

The leaves of the plant were also attacked by a fungus. This can be killed with a solution of copper sulphate (blue-stone) in the proportion of 1 in 1,000.

INSECT NOTES.

Dry Powder Gun.

Several of these 'guns' have been imported into the West Indies for the application of Paris green to cotton and other crops, and appear to have given satisfaction. The following description is given in Messrs. Peter Henderson & Co.'s catalogue:—

For applying any dry powder, such as Paris green, hellebore, insect powder, plaster, etc., on plants or trees, the powder being evenly distributed over a wide space and with the least possible waste, the work being more rapidly done than by any other known instrument. It is 27 inches long, with extra tubes for dusting trees and holds 1 quart of powder. By turning the crank a fan is rapidly revolved which forces a current of air through the tubes, that carries with it a small portion of powder. The quantity may be increased or diminished as desired.

The Auto-spray.

This is an automatic, compressed air sprayer in which the pumping is all for the purpose of compressing the air in the receptacle, while the spraying is accomplished by the expansion of this compressed air.

The sprayer consists of a plain, brass cylinder containing an air pump, a sling for carrying the whole, and a discharge pipe and nozzle.

The Auto-spray is cheaper than the Success knapsack sprayer, and although perhaps not quite so durable, is a very simple and practical machine. A certain amount of care must be exercised, as, if too much pressure be put on, the tank might burst at the seam.

The nozzle which is sold with this machine is a special feature, since it combines the Vermorel principle of spray with an automatic cut-off, and the needle used for clearing the nozzle vent forms also a part of the cut-off arrangement.

The cost of the Auto-spray in the United States is from $5 to $7, while the knapsack sprayer costs $12. The former can be purchased in Barbados, complete with hose and nozzle, for $10.

Black Grub or Cut Worm.

The various species of insects known as Black Grubs or Cut Worms are made the subject of one of the *Circulars* of the Ceylon Royal Botanic Gardens, Vol. II, no. 2, March 1904. The depredations of these insects in tea nurseries are mentioned, and remedies given. The remedies include poisoned baits and traps. Poisoned baits include freshly cut grass and clover dipped in Paris green mixture, and bran mixed with Paris green at the rate of 1 lb. Paris green to 1 bushel bran. These baits are put about in small piles at frequent intervals in the field. Growing the plants in a cylinder of tin or paper prevents the grub from getting at the stem of the plant.

Kainit and nitrate of soda are known to act as deterrents to the cut worms, when applied to the fields as top dressing. Small conical holes in the ground, empty jam tins, etc., serve a useful purpose as traps into which the grubs fall, and from which they are unable to crawl out.

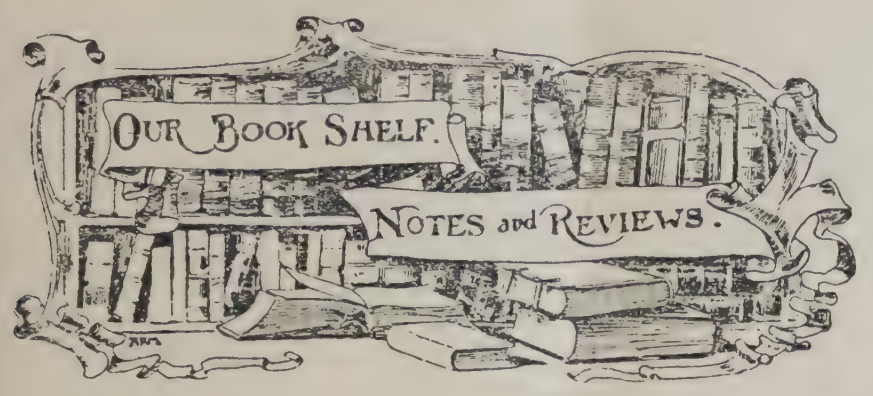
Last season, cotton in some parts of the West Indies was attacked by cut worms. In case of other attacks probably the best bait would be a mixture of bran, molasses and Paris green. The tins, etc., have been successfully used at St. Kitt's as traps for the mole cricket (*Agricultural News*, Vol. II, p. 200). The bait of bran, molasses and poison should be valuable for use in fighting the mole cricket.

RUBBER PLANTING IN CEYLON.

We extract from the annual report of the Director of the Royal Botanic Gardens for 1903 the following account of the efforts that are being made to establish a rubber industry in Ceylon:—

The planting of rubber, more especially the Para kind, has been pushed on very rapidly during the year, and it is probable that about 12,000 acres are now devoted to this product, which bids fair to become the largest of the 'minor' agricultural industries. The export for 1903 was 389 cwt. (43,568 lb.). Its success is a source of legitimate satisfaction to this Department and to the Governments concerned. It must not be lost sight of that Ceylon is now reaping the benefit of the action of the Indian Government aided by the Royal Botanic Gardens, Kew. The distribution of the tree in the island and the elaboration of the methods of cultivation and of tapping and preparing the rubber have been the work of this Department. The cleanliness of the Ceylon 'biscuits' meets with much favour in Europe, and high prices, reaching at times even as much as 5*s*. per lb., have been paid for them, prices considerably exceeding those paid for the best 'wild' rubbers. It seems not unlikely that the latter will in time be largely driven out of the market by the cultivated rubber, as occurred in the case of cinchona. At the same time, recent scientific investigations into the nature of rubber latex have thrown a good deal of light on the probable synthesis of rubber, and brought its artificial production measurably nearer. There is no need for alarm as to the future of rubber planting, for it is hardly to be expected that any efficient substitute or synthesized rubber will be produced on a large scale for many years to come at a price that will render rubber cultivation unremunerative. At present profits are large, and planters can face a considerable reduction in the price of rubber; but now, while profits are good, is the time to study improvements, to try experiments on the best methods, and to reduce the cost of production. Careful attention is required to the methods of preparation, which at present are open to great improvement. It is of great importance to keep up the name which Ceylon rubber is acquiring for good quality and cleanliness. Some samples which have been exported show that the milk has not been properly filtered, as recommended by Mr. Parkin, and others have been taken from too young trees, the rubber consequently lacking tenacity.

Planting is going on in all directions, and even in some unsuitable places, where disappointment is likely to ensue. Preparations are being made to try Hevea trees under irrigation at the Cotton Experiment Station at Mahailuppalama; should this prove successful an important industry will be thrown open to cultivators in the dry zones. Some alarm has been caused by the attacks of a canker fungus in many districts, but prompt steps have been taken for its treatment under the advice of the Mycologist, in whose report details will be found.



SENIOR COUNTRY READER, III: By H. B. M. Buchanan, B.A., *London: Macmillan & Co., Ltd., 1904.* Price, 2*s*.

Among our book-shelf notes (Vol. II, p. 235) will be found a short review of a *Country Reader*, Part II. The present volume belongs to the same series and is equally to be recommended.

It is entirely devoted to agricultural matters. Beginning with a chapter on 'Simple principles of manuring,' and another devoted to the use of agricultural implements, it goes on to deal with the various crops commonly cultivated in Great Britain.

The later chapters should prove almost as useful in West Indian as in English schools: they deal with such subjects as 'Cottage gardens,' 'Cottage pigs,' 'Cottage poultry,' 'Hares and rabbits—a comparison,' etc.

The chapters on poultry and rabbits are particularly well written and contain many useful suggestions, such as what birds and what breeds of rabbits to keep, the arrangement of the hutch, and so on.

This little book contains a large number of admirable illustrations (one of which we reproduce on p. 247), and at the end is a vocabulary explaining many of the words used.

A West Indian teacher, who is interested in agriculture and devoting his attention to a school garden, would be likely to find this little reader full of suggestions that would be useful to him both in his teaching and in his practical agriculture.

SISAL EXPORTS FROM MEXICO.

The following note, which appeared in the *South American Journal*, London, of February 13, 1904, is taken from the United States *Monthly Summary of Commerce and Finance* for February:—

The export of henequen or sisal hemp, as it is often called, during the calendar year 1903 from Yucatan, through the ports of Progresso and Campeche, consisted of 611,939 bales, value declared in the custom-houses, $36,040,032·32.

The exports during the last five years were: 1899, 445,978 bales; 1900, 499,626; 1901, 517,519; 1902, 528,246; 1903, 611,939.

It will be observed that there has been a steady increase in the production of henequen. The latest information is that during this year (1904) the plantations are being very considerably increased; the yield for the year is expected to exceed last year's.

DEPARTMENT NEWS.

At a convocation of the University of Durham, held on June 22, the honorary degree of D.C.L. was conferred upon Sir Daniel Morris, K.C.M.G., D.Sc., M.A., F.L.S., Imperial Commissioner of Agriculture for the West Indies.

EDUCATIONAL.

Agricultural Apprentices in British Guiana.

At the last meeting of the British Guiana Board of Agriculture it was decided to approve of a scheme of agricultural apprenticeship whereby boys were to receive instruction at the Botanic Station and experiment fields. The following are the principal suggestions:—

That the number of apprentices shall for the present be limited to six.

That a three-months' probation shall be allowed.

That the age limit shall be between fifteen and eighteen years. That the period of apprenticeship shall be three years.

That the rate of pay shall be 16c. per diem for the first year, 20c. for the second year, and 24c. for the third year.

That the apprentice shall attend one course of lectures to teachers at Queen's College during the second and third years of his apprenticeship.

That a plot of land shall be given to such apprentices as are deserving of it, after the first year.

That, if feasible, opportunities shall be offered to the apprentices of accompanying an Agricultural Instructor on some of his visits during the third year of apprenticeship.

A School Garden in St. Lucia.

On a recent visit to St. Lucia, we were much impressed with the excellent results that had been achieved in the garden at the Castries Anglican Juvenile School. This is undoubtedly one of the best attempts of the kind we have seen. Through the courtesy of the Inspector of Schools we were enabled to obtain from the teacher notes from which the following brief sketch of the operations that have been conducted has been compiled:—

Operations were commenced soon after the Easter vacation in 1902, the necessary funds being supplied by the Manager for the clearing, forking, bedding, etc., of a plot, 72 feet by 32 feet, which was made up into eleven beds, 4½ feet wide, with 2-feet walks between.

Cabbage, tomato, egg plant, onion, beet, lettuce, and other seeds were sown in boxes, and the seedlings transplanted into beds by the boys.

In November, an additional plot, 68 feet by 36 feet, was made up into ten beds, 5 feet wide.

Nine exhibits were sent to the Agricultural Show held on March 27, 1903, for which three first prizes were awarded.

Throughout 1903 and up to the present the cost of upkeep has easily been met by the proceeds of the sales of produce.

A bed, 20 feet by 4½ feet, was planted with Sea Island cotton seed in September 1903. The lint was beautifully hand-picked by the girls.

Cabbages have been grown weighing over 6 lb.; tomatos, 4 oz.; egg fruits, 4 lb.; sweet peppers ('Ruby King'), 6 inches long.

Much trouble has been experienced from attacks of the mole cricket.

Over two dozen kinds of garden vegetables and eight other kinds of plants have been grown from time to time.

The teacher of this school is to be congratulated upon the excellent results that have followed his efforts.

GLEANINGS.

The Imperial Commissioner of Agriculture has presented to the Zoological Society of London two specimens of the tuberculated Iguanas (*Iguana tuberculata*) from Montserrat. One of these was about 3 feet long.

A special number of the *West India Commitee Circular* was issued on June 28 devoted to a report of the lecture on 'The Agricultural Industries of the West Indies,' delivered by Sir Daniel Morris on June 23.

At the last meeting of the British Guiana Board of Agriculture it was reported that a field in front of the Orphan Asylum was to be utilized for specimen minor cultivation of such crops as rubber, sisal hemp, coffee, and cacao.

As a result of the damage done to the cultivations at the Government Reformatory, Jamaica, the value of the products reaped during the year 1903-4 was only £185 18*s.*; in the previous year it was £364 18*s.* 9*d.*

At the request of his Highness the Khedive, three wardian cases of the following varieties of bananas have been shipped from Barbados for trial in Egypt:— dwarf or Chinese, Jamaica or Gros Michel, red banana, fig, and the silk banana.

According to the *Consular Report* on the trade of Porto Rico for 1903, cotton cultivation experienced an active revival all over the island. It is said that about 10,000 acres have been planted with cotton during the year, and that some 5,000 bales have been produced.

The D. W. I. Fruit Company is making a pretty large shipment to Copenhagen to-day by the 'St. Croix.' Besides various kinds of dried fruits (bananas, pines, tamarinds) there are honey, wax, cocoa-nuts, yams, limes, etc., and several casks of tobacco grown in St. Croix. (St. Thomas *Bulletin*, July 5.)

The 24th. inst.—St. John the Baptist Day—was a busy one at the Botanic Garden; a large number of people went to the gardens for plants. Budded Washington navel oranges, spices, guavas, sweet oranges, and mandarins were the principal fruit plants in demand. Shade trees, etc., were also requisitioned. (Grenada *Federalist*, June 28.)

In the Belgium *Bulletin of Agriculture* an account is given of experiments to test the duration of the effect of green manure. 'The results indicated that the effect of green manuring is quite noticeable on early potatos, less marked on late potatos, still less marked the second year, and disappears the third.' (*Agricultural Gazette* of New South Wales.)

The Local Instructor at Montserrat reports that there is a good demand for papain, which is likely to increase, as Americans are advertising medicines made from this drug. Large quantities sent from India have, however, had the effect of lowering the prices.

Prizes are being offered in Trinidad by the Government for (1) the best 2 acres of Sea Island cotton, (2) the best 1 acre, (3) the best sample of ginned Sea Island cotton in bale of not less than 150 lb. in weight. Sufficient seed will be supplied *free* to those entering the competition.

The 'divi-divi' of commerce contains on the average from 40 to 45 per cent. of tannin. The commercial value of such material at present is from £8 10*s.* to £11 per ton, and it is probable that Indian 'divi-divi' of the same quality as the present sample would sell readily at this price. (*Bulletin of Imperial Institute*, June 30.)

In *Farmers' Bulletin* No. 190 the following method is recommended for disposing of animals dying of contagious diseases:—'In the absence of a furnace or specially prepared place for burning, a hole or trench, 2 or 3 feet deep, may be dug, a layer of brushwood placed on the bottom, and on this the body covered with brushwood sprinkled with kerosene.'

The fifth annual show was held under the auspices of the Port Royal Mountains Branch of the Jamaica Agricultural Society at the Hope Garden grounds on Wednesday, July 6. The show was an entire success, the attendance being large and the exhibits of high quality. As usual at this show, the exhibits of minor products were very numerous and attracted much attention.

During the fortnight ended June 30, 195 bales of West Indian cotton were imported into the United Kingdom (London, 154 bales; Southampton, 30; Bristol, 11), sales being effected at the following prices: West Indian, 5·91-6·38*d.* per lb.; West Indian Sea Island, medium fine, 14*d.*; fine, 15*d.*; extra fine, 16*d.* per lb. (*West India Committee Circular.*)

Bermuda holds a unique place in the Western World. It is a little country, with absolutely no manufactures or railways, with agriculture alone as its industry (the annual export of potatos, onions, bulbs, and vegetables being about $500,000), with no business but that of selling goods at retail and in a limited way warehousing of wines and spirits; nevertheless Bermuda is of importance in the Western Hemisphere. (*U. S. Consular Reports*, March 1904.)

The most important industry in this consular district [Honduras] is the raising and cultivation of bananas. The United States takes the entire crop. The last year has been a very satisfactory one and good prices prevailed. The area of cultivated ground has been considerably increased. Quite a number of orange, lemon, and rubber trees have been planted, and the exportation of these products is expected to increase. (*U. S. Consular Reports.*)

The British Consul at San Francisco states in his annual report that the exports of citrus fruit from California show a constant increase since 1892. Not many of the Californian oranges appear to go to the United Kingdom. The importations of oranges and lemons show a decided decrease. Growers are most anxious to obtain a machine for extracting oil of lemon as the present process is not found to be satisfactory.

BRITISH HONDURAS: REPORT ON THE BOTANIC STATION, 1903. By E. J. F. Campbell, Superintendent.

This report gives an account of the work carried on at the Botanic Stations and Nurseries under the supervision of the Superintendent.

The Belize Station is maintained as an ornamental garden, the soil being unsuited for economic plants. The nursery attached to this station is described as important, being utilized by persons from all parts of the colony.

At Stann Creek a variety of crops are being experimented with, including cacao, vanilla, nutmeg, Liberian coffee, etc. A number of small experiment plots were also planted at Corosal.

The Superintendent has given practical instruction in agricultural matters in a number of cases where his services were requested by small planters and others.

The parasol ant is described as being the worst pest of the British Honduras agriculturist. Carbon bisulphide is described as being effective, but its price is very high.

An appendix to the report deals with experiments in cotton growing carried out at the stations and in conjunction with planters. The cultivation is still in the experimental stage, but there is reason to believe that cotton will be planted extensively during the coming season.

TRINIDAD: REPORT ON THE BOTANICAL DEPARTMENT, 1903-4. By J. H. Hart, F.L.S., Superintendent.

This report, which forms No. 17 of the series of Annual Reports, describes the work of the department for the last financial year.

The number of purchasers of plants at the nursery was 601, an increase of 201 over the previous year's record.

Two Agricultural Instructors were supplied, whose duties included visits to every district of the island for the purpose of affording agricultural instruction in the schools and giving public instruction on agricultural topics at meetings, etc. Lectures were also given by the Superintendent at seven centres.

There is a large stock of plants in the nurseries; the large demand for economic and ornamental plants has been fully met.

Mr. Hart makes interesting observations upon the seedling cane experiments, which have been continued with satisfactory results.

Interesting notes are also given on a large variety of economic plants grown in the gardens, which include rubber, timber, and fruit trees.

Experiments have been carried out with cotton, and seed, obtained through the Imperial Department of Agriculture, was distributed to the amount of 1,201 lb.; cotton has been ginned at the St. Clair Station by means of two handgins provided by the Government.

ONION CULTIVATION.

Jamaica.

The following note, reprinted from the *Journal of the Jamaica Agricultural Society* for June, records the experiences of a grower of onions in Jamaica:—

In December 1897, I got ½ lb. of Bermuda onion seed from Messrs. Peter Henderson, New York: I sowed these in drills in nursery beds which had been thoroughly forked and raked quite smooth. When they grew to about the thickness of a pencil, I set them out to grow in deep loam soil which had also been thoroughly forked and raked quite fine. The beds were 4 feet wide and the onions planted in rows, 2 feet wide by 8 inches in the step. I kept them hand-weeded and moulded high all the time, and irrigated once a week until the onions began to dry. After that I did not irrigate or mould again. I left them in the ground until the stalk dried down to the bulb, then lifted them and gave them three days' sun. They were then ready for market. I got 25*s.* per 100 lb. for them, selling them in Kingston and Spanish Town. They were very much praised by the buyers. About one-third of the crop weighed ½ lb. each, and they were very delicate in flavour. One quarter of an acre netted me £13 10*s.* These were grown at Turner's pen, near Spanish Town.

In 1899 I grew a small quantity at Colbeck for my home use. I cultivated these in the same way, but without irrigation, and not on such good soil, and these turned out fairly well, but did not come up to the standard of the irrigated ones.

West Indian Onion Trade.

At a meeting of the Antigua Agricultural and Commercial Society held on July 1, the Hon. F. Watts read the following extracts from a letter from Mr. S. Webb, of the firm of Wieting & Richter, of Georgetown, Demerara, relating to the onion trade:—

Latterly consignments of onions have been coming to this market from your island to parties here who do not know much about the trade, nor have they much hold on the buyers.

It has occurred to me that the following hints may be useful to growers and packers.

From March to June we generally get Teneriffe onions. The complaint against these onions is that their flavour is too mild and they are put up in strings, with far too much of the stalk on each string, which weighs as onions.

From June to September-October, Madeira onions come in, put up in bunches, with far less of the stalk plaited in. They are full flavoured. From October to March we have to depend on Lisbon for our supplies. New Lisbon onions very seldom reach here in good order, and could Antigua or Barbados compete in these months, no doubt the trade could be deflected from Lisbon to our soils in the West Indies. But your onions at present are not treated in a way to suit this trade. The onions are, mind you, fairly good onions, but the roots should not be cut very close to the onion, nor should the stem be close cut; the stems should be at least 6 inches long, to allow for drying. The stalks should be allowed to dry gradually; if cut close up to the onions, they (the onions) get hard and lumpy in their centres, which causes them to burst and spoil quickly.

If your packers could bunch their onions and not ship them loose, their commercial value would be much enhanced.

WEST INDIAN PRODUCTS.

New York.

The following notes on West Indian products are taken from the annual report of Consul-General Sir Percy Sanderson, K.C.M.G., on the trade and commerce of New York and district for 1903 (Foreign Office: Diplomatic and Consular Reports, No. 3,159):—

Cacao showed an increase of about 10 per cent. in both quantity and value.

Coffee decreased both in quantity and value, and the import from the East and West Indies diminished by about 50 per cent. The price ruled lower till towards the end of the year, when it rose somewhat rapidly owing to speculation.

The importation of jute decreased by over 50 per cent. in quantity and only a little less in value. There was a slight increase in quantity but a decrease in value in manila, and an increase in both quantity and value in the import of sisal.

Crude India-rubber showed an increase of about 10 per cent. in quantity and 38 per cent. in value.

There was a large increase in the quantity of cane sugar imported, due probably to the treaty with Cuba, but the value did not show a corresponding increase.

The export of Upland cotton shows an increase of about 5½ per cent. in quantity and over 25 per cent. in value as compared with 1902; a reduction of 7 per cent. in quantity, but an increase of over 36 per cent. in value as compared with the average of the previous five years. The price increased enormously during the year, owing to speculation. In January it stood at 8·90c., from which point it gradually rose to 13·50c. towards the end of July; during August there was a partial reaction to 12·75c. and from that point the price gradually fell till it reached 9·6c. in October; on reports, however, of a crop under 10,000,000 bales speculation was renewed, the price advanced to 13·7c. in December, and was pushed far higher in January 1904. The largest export is to the United Kingdom, and the quantity exported increased in 1903 as compared with the previous year.

From the figures given in the table of imports at the end of the report, we notice that the total value of bananas imported into New York for 1903 was £324,000, being a decrease in value compared with 1902, of £3,000. The quantities imported are not given in this report.

The value of vanilla beans imported during the year was £269,003; this was an increase of £127,000 compared with 1902. The quantities imported were: 1902, 201,000 tons; 1903, 326,000 tons. Mahogany, to the value of £276,000, was imported in 1903, being an increase of £10,000 as compared with 1902.

CIRCULAR TO EXHIBITORS AT SHOWS.

The *Journal of the Jamaica Agricultural Society* for June publishes the following 'Circular to Exhibitors,' issued by the Port Royal Mountains Show Committee, which, it is stated, is 'appropriate enough to be put on permanent record as containing useful hints for intending exhibitors at any show':—

Do not decide to enter exhibits at the last moment, but several months before, if possible. This will allow plenty of time for improving, selecting, and preparing exhibits. First read your 'prize list' carefully and follow the regulations given therein. If six varieties of vegetables are required send *six* not eight or three, or some *other* number. By a 'design' (of flowers for instance) is meant a *design*, not a mere bunch and so on. If you do not quite understand the prize list or regulations, get some one who does to explain them to you.

Be particular at the show with your exhibits.

Be honest—do not show someone else's products as your own.

Be sure that your exhibit is entered for the right class, and that the label is fully and correctly filled up. If possible see to this before the day of the show. The fact that the authorities will do their best to prevent your blundering does not in any degree relieve you of responsibility. Exhibitors must wait their turns and deliver exhibits at the show ground to the member of the committee arranging the class in which they are to be exhibited. They must not be dumped down anywhere.

SELECTION AND PREPARATION OF MINOR PRODUCTS.

Vegetables, bread-kind, fruits, etc., must be of good size, well shaped, good colour, nice flavour, and clean. They must *not* be so over-grown or old as to be coarse, or bruised, mildewed, rusty, or insect eaten. Pick all exhibits by hand, if possible. Wash roots (such as cocos, carrots, and turnips) and fruits, if necessary, with a soft cloth, don't scrape them. Cut cabbages, lettuces, flowers, etc., early the morning of the show or after sunset on the day before so that they may be quite fresh.

Pot Plants.—Don't exhibit these in such things as old tins or boxes, or at any rate pick out the neatest you can find and paint them green or brown. Clean all pots. Remove insects and weeds. Prune the plants to remove (a) branches that spoil the shape of the plant, (b) dead or insect-eaten branches or leaves, (c) excess of buds. Put a layer of damp moss about an inch deep above the soil in the pots. Don't exhibit a pot or box too large or too small for the plant.

Packing.—Everything connected with the packing of exhibits must be, first of all, clean, and then of neat and simple design. Wooden trays, painted green, do well for most exhibits. Oils, preserves, pickles, syrups or liquids must be put up in clean, white, glass bottles or jars. Don't use coloured glass. If your exhibit is a novelty, attach a neat card with its name and what it can be used for. Pack exhibits very carefully for carrying to the show. Put soft paper between fruits, etc., liable to bruise. Shade from sun everything liable to wilt.

Animals.—Groom well morning of show, having done so for months before, and afterwards *always* continue this good practice. Use neat halters. Clean all the harness, and the trap perfectly. See that live stock are quite comfortable before you leave your exhibit.

CONCLUSION.

The judges' duty is to search for faults, make a note of the faults in your exhibits, and correct for next show. Be prepared for the judges differing from you as to which exhibit deserves the prize. Don't hang around to listen when the judging is going on. If you have a good reason for believing that your exhibit has been overlooked by the judges make a polite appeal at once to the secretary and you will get justice. Do not be disorderly and risk being sent away. Remember your exhibit will have helped the success of the show, even if not quite good enough to take the prize this year. Try again next time!

MARKET REPORTS.

London,—July 5, 1904. Messrs. KEARTON, PIPER & Co., Messrs. J. HALES CAIRD & Co., Messrs. E. A. de Pass & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 1, 1904; and 'THE PUBLIC LEDGER,' July 2, 1904.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* to 3½*d.*; Bermuda, 1/2 to 1/6 per lb.
BALATA—Demerara Sheet, 1/7 to 1/10; Venezuelan Block, 1/4 per lb.
BEES'-WAX—£7 5*s.* to £7 12*s.* 6*d.* per cwt.
CACAO—Trinidad, 59/- to 61/- per cwt.; Grenada, 50/- to 57/6 per cwt.; Dominica, St. Lucia, and Jamaica, 51/- to 57/- per cwt.
CARDAMOMS—Mysore, 7*d.* to 3/3 per lb.
COFFEE—Jamaica, good ordinary, 38/- per cwt.
COPRA—Trinidad, sundried, £17 to £17 5*s.* per ton, c.i.f.
COTTON—West Indian Sea Island, 15*d.* to 16*d.* per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—10/- to 11/- per case.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Jamaica, common to middling, 31/- to 40/-; good fair bright, 43/6 to 46/- per cwt.
HONEY—18/- to 30/- per cwt.
ISINGLASS—West Indian lump, 2/2 to 2/10; Cake, medium palish, 1/2 to 1/5 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 1/3 to 1/6 per gallon; Concentrated, £12 10*s.* to £13 10*s* per cask of 108 gallons.
LIME OIL—1/5 to 1/6 per lb., distilled.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—1/1 to 1/8 per lb.
NITRATE OF SODA—Agricultural, £10 2*s.* 6*d.* to £10 7*s.* 6*d.* per ton.
NUTMEGS—110's, to 100's, 8*d.* to 9*d*; 54's, 2/7 per lb.
PIMENTO—3*d.* per lb.
RUM—Demerara, 7*d.* to 8*d.* per proof gallon; Jamaica, 1*s* 3*d.* to 8/- per proof gallon; Leewards, 7*d.* to 10*d.* per proof gallon.
SARSAPARILLA—Jamaica, 8*d.* to 9*d.* per lb.
SUGAR—Crystallized, 15/6 to 16/9 per cwt.; Muscovado, Barbados, 15/3 per cwt.; 89°, 9*s.* 3*d.* on floating terms; Molasses, 11/6 to 15/- per cwt.
SULPHATE OF AMMONIA—£12 per ton.
TAMARINDS—Antigua, 7/- to 8/-; Barbados, 10/- to 10/6 per cwt.

Montreal,—June 9, 1904.—MR. J. RUSSELL MURRAY. (In bond quotations.)

BANANAS—Jamaica, $1·25 per bunch of 8 hands; $1·40 per bunch firsts; $1·65 per bunch Jumbos, c. & f.
CACAO—Jamaica, 11c. to 12c. per lb. c. & f.
CEDAR—Trinidad, 45c. per cubic foot, c.i.f.
COCOA-NUTS—Jamaica, $24·00 to $26·00; Trinidad, $21·00 to $23·00 per M. c. & f.
COFFEE—Jamaica, medium, 8½c. to 9½c. per lb. c. & f.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per lb. c. & f.
LIMES—Jamaica, $6·00 per barrel c. & f.
MOLASCUIT—Demerara, $1·32 per 100 lb. c. & f.
MOLASSES—Barbados, 22c. to 25c.; Antigua, 21c. to 22c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 17½c. to 18½c. per lb. c. & f.
PIMENTO—Jamaica, 7½c. to 7¾c. per lb. c. & f.
SUGAR—Grey Crystals, 96°, $2·40 to $2·50 per 100 lb. c. & f.
—Centrifugals, 89°, $2·05 to $2·15 per 100 lb. c. & f.
—Molasses, 89°, $1·88 per 100 lb. c. & f.
—Barbados, 89°, $2·25 per 100 lb. c. &. f.

New York,—July 8, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12½c. to 13c.; Jamaica, 10¼c. to 11½c.; Grenada, 12¼c. to 12½c.; Trinidad, 12c. to 13¾c. per lb.
COCOA-NUTS—Trinidads, $20 to $21 per M., selected. Jamaicas—No quotations.
COFFEE—Jamaica, fair to good ordinary, 7c. to 7¼c. per lb.
GINGER—Jamaica, 6½c. to 8c. per lb.
GOAT SKINS—Jamaicas, 52c. to 54½c. per lb.
PIMENTO—6¼c. to 6½c. per lb.
SUGAR—Centrifugals, 96°, 3 15/16c. to 4c.; Muscovados, 89°, 3 7/16c. to 3½c.; Molasses, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 13, 1904.—Messrs. BENNETT BRYSON & Co., LTD.

MOLASSES—14c. per gallon (Imperial).
SUGAR—$1·90 per 100 lb.

Barbados,—July 16, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·50 to $3·70 per 100 lb.
CACAO—$11·50 to $14·00 per 100 lb.
COCOA-NUTS—$10·75 per M. for husked nuts.
COFFEE—Jamaica, $9·00 to $10·00; ordinary Rio, $11·00 per 100 lb.
HAY—$1·00 per 100 lb.
MANURES—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $75·00; Sulphate of potash, $67·00.
MOLASSES—14c. per gallon (puncheon included).
ONIONS—Madeira (stringed), $2·25 per 100 lb.; Bermuda, —No quotations.
POTATOS, ENGLISH—$1·80 to $1·87 per barrel.
RICE—Ballam, $4·50 to $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
SUGAR—in hhds., 89°, $1·95 (packages included). Dark Crystals, 96°; $2·20 per 100 lb.

British Guiana,—July 14, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $8·50 per barrel.
BALATA—35c. to 40c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—$7·00 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 12c. to 12½c. per lb. (retail). —Creole, 11c. per lb.
DHAL—$4·50 per bag of 168 lb.
EDDOES—96c. per barrel.
MOLASSES—Vacuum Pan yellow, 16c. per gallon (casks included).
ONIONS—$2·00 per 100 lb., ex 'Pocklington'; Teneriffe, 1¾c. to 1½c. per lb.
PEA NUTS—Curaçoa, 4c.; American, 5¾c. to 6c. per lb. (retail).
PLANTAINS—20c. to 32c. per bunch.
POTATOS, ENGLISH—$3·00 to $3·25 per barrel.
RICE—Ballam, old, $4·60; new, $4·50; Creole, $4·50 per 177 lb., ex store.
SWEET POTATOS—Barbados, $1·44 per barrel, $1·20 per bag.
TANNIAS—$1·32 per barrel.
YAMS—White, $1·92 per bag.
SUGAR—Dark Crystals, $2·20 to $2·22½; Yellow, $2·50 to $2·60; White, $3·50 to $3·75; Molasses, $2·00 to $2·15 per 100 lb.
TIMBER—Greenheart, 32c. to 34c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75 and $5·50 per M.

Trinidad,—July 14, 1904.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, $12·10 to $12·25; Estates, $12·20 to $12·45; Venezuelan, $12·50 to $12·80 per fanega (110 lb.).
COCOA-NUT MEAL—1¼c. per lb.
COCOA-NUT OIL—67c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 6½c. per lb.
COPRA—$2·65 to $2·70 per 100 lb.
ONIONS—Teneriffe, $1·00 per 100 lb.
POTATOS, ENGLISH—$1·75 to $2·00 per 100 lb.
RICE—Yellow, $4·25 to $4·35; White Table, $5·50 to $5·75 per bag.
SUGAR—White Crystals, $2·20 to $3·35; Molasses Sugar, —No quotations.

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 61. BARBADOS, AUGUST 13, 1904. PRICE 1*d.*

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Shipment of Bananas from Barbados.

THERE are one or two matters in connexion with the shipment of bananas from Barbados to which we desire to draw the attention of shippers. Mention has already been made in the *Agricultural News* of the need for greater care in the making of crates. The points for shippers to remember are—first, that in making their crates they should conform to certain standard measurements; secondly, the crates must be made of suitable material and sufficiently strong to enable them to be handled without getting broken.

First, then, in the matter of the size of crates. Complaints have been made by the Royal Mail Company that many of the packages are far larger than is necessary and consequently take up more than their fair share of space. Mention was made of one bunch which was packed in a crate fully 6 inches too long and 3 inches too wide. But besides this, as pointed out by Messrs. Pink & Sons in a recent letter to Mr. J. R. Bovell, when larger crates are used than are required, it becomes necessary to use more packing. In consequence, particularly at this time of the year, the fruit is kept too hot and is over-ripe when it reaches England. In order to secure as much uniformity as possible, the company has suggested three standard sizes for crates, viz., (1) 27 inches by 15 inches, (2) 30 inches by 17 inches, and (3) 34 inches by 17 inches. For these three sizes the uniform rates to be charged to Southampton will be 1*s.* 6*d.*, 2*s.*, and 2*s.* 6*d.* respectively. For all other crates, not conforming to these standards, the charge will be 16*s.* 8*d.* and 5 per cent. per ton measurement. It will thus be seen that it is both to the shipper's interest and the company's convenience that an effort be made to secure the uniformity suggested. It may be mentioned that, so far as the shipment of bananas by the Depart-

ment is concerned, the new freight rates will come into operation with the first shipment next month.

Next, in regard to the material to be used in making crates. These require to be made of tough wood that will not split. It has been found that pine wood is not suitable for the purpose, as it is not sufficiently strong to bear handling. If the crates get broken, it stands to reason that the bananas will be bruised, and they cannot in that case be expected to arrive in a good condition.

Similarly, Mr. Bovell has found it necessary to draw the attention of shippers to the fact that bananas have been sent for shipment packed in crates the slats of which were too thin. These ought to be half an inch in thickness. Again, others have had the slats projecting in such a way that they could easily be knocked off. Mr. Bovell has, therefore, warned shippers that bananas sent in such crates will not be accepted for shipment.

It must be clearly understood that at this stage in the establishment of the banana industry, when every effort must be put forth to ensure the arrival of the fruit in the best possible condition, so that Barbados bananas may gain for themselves a good name in the English markets, most serious attention must be paid to such important matters of detail as those mentioned. It is only by exercising every care in the handling and packing of the fruit that it can be hoped to secure good prices. As our readers are well aware, good prices have been obtained, and the profits from the industry have been satisfactory; moreover, Barbados bananas are beginning to be known and appreciated in the English markets. It is with the view of assisting this promising industry that we refer once more to this subject.

Further emphasis is given to the necessity that exists for exercising the greatest care, not only in packing but also in picking bananas for shipment, by the following extract from a letter addressed to the Royal Mail Steam Packet Company by Messrs. J. & E. Hall, Limited, who have just completed the fittings of the 'Tagus' and 'Trent' for the cool transport of fruit:—

'The success of the fruit-carrying department will largely depend upon the condition in which the fruit is stowed and on the handling of the plant before and after loading. If the fruit is cut too "full," no refrigerating power will carry it, once it has reached a certain degree of ripeness. It is found necessary on large fruit-carrying steamers to watch very closely the loading, and the different degree of ripeness of fruit is very difficult to determine by any but experts. We wish to draw attention to the importance of this aspect of the question, as we notice that even with all precautions on the part of shipowners, bananas are very often put on board in a state which is very prejudicial to their safe carriage and to obtaining a good market price at this end.'

SUGAR INDUSTRY.

Seedling Canes in Trinidad.

The following note in regard to the future cultivation of seedling canes in Trinidad is taken from the *Report on the Botanical Department* for 1903-4:—

This season it is proposed to eliminate many of the seedlings, which have shown insufficient characters to render them worthy of general cultivation, and to use the area they have previously occupied for extending the cultivation of selected kinds, so as to afford material for planting on a larger scale.

It would appear from results that our practice of cutting annually in May for several years past has led to a diminution of seed production; as most of the varieties have produced either no seed at all, or only small and insignificant quantities. It is proposed therefore to select and plant a few of each of the best varieties in beds, for seed purposes only, and to allow them to remain over, without cutting, for longer periods than twelve months. Seed collected in October 1903 was small in quantity, but a goodly number of plants was raised, which will appear in due course. It has also been noted that the seedlings raised during the past four years have not shown the same variety or the same sucrose content as the batches raised six or eight years ago; and the evidence appears to point to this also being due to annual cutting, i.e., not allowing the cane a sufficient period of growth previous to the flowering stage, which generally occurs in Trinidad in October and November of each year.

The Difference between Cane Sugar and Beet Sugar.

The *Journal d' Agriculture Tropicale* for June 1904 contains an article by Mr. George de Préaudet dealing with the superiority of cane over beet sugar. We give the following summary:—

It is evident that of all refined sugars the purest is white cane sugar. For if this were identically the same as white beet sugar, as is held by some authorities, why is it that the large manufacturers of champagne require their sugar dealers to give them a formal declaration that they never allow into their works a single bag of beet sugar? Experience has shown that wines sweetened with beet sugar always give an after-taste of beet root.

A very easy test is carried out as follows: Take two glasses containing moistened sugar—one beet and the other cane. Cover both with saucers and allow them to stand for some days. If they are tasted at the end of that time, it will be found that the beet sugar has assumed a taste of beet root and also emits a slight odour.

The refining of beet sugar is not carried on with as much care as is that of cane. The best, purest, and most delicate sugar is made from the sugar-cane.

An Ideal Sugar-cane.

The Queensland *Agricultural Journal* for April publishes the following extract from a statement made by Dr. Stubbs in a New Orleans paper:—

Six years ago we received a large number of various canes from Trinidad. We promptly began to experiment. We tried to ascertain which cane was best adapted for this climate. We made a score or more experiments and carefully compared the results. We wanted to get a cane that would find ready and congenial growth here in Louisiana, and that would at the same time increase the sugar output for the acreage in this State.

I am delighted to say that our patience has at length been rewarded. We now have two kinds of cane that are highly successful. They are unquestionably a great deal more satisfactory than the best cane known here for many years. In my opinion, they are the most valuable canes that can be grown in Louisiana soil. They make what our agricultural experts call an ideal specimen. We have classified them as 'T. 95' and 'T. 74.' *

To the lay public there is nothing exceedingly significant in these words 'T. 74,' but to the sugar-planter they will be nothing less than startling. This cane produces 38 tons to the acre. The juice yields 16 per cent. of sugar. Under a nine-roller mill 81 per cent. is obtained without saturation.

If you will compare these figures with statistics of cane now grown, you will realize that this new cane will revolutionize the sugar industry of Louisiana. The old cane gives an acreage of 20 to 30 tons, with a 12-per cent. yield in the juice. Under the roller, it gives a percentage of 71.

The new cane is long-jointed, green, perfectly healthy, and beautiful in appearance. It has an excellent stubble and remarkable vigour. It withstood the terrific gale that swept over the city on September 9 and 10. It is deep-rooted and strong, and was the only cane in the field that was not blown either flat or partly down to the ground. It was not damaged the least bit by the storm.

We are ready and willing to furnish this cane to any planter who may apply for it. We expect to send out more than 500 bundles in the next few weeks. Requests for the cane are coming in on every mail. We shall begin to ship the cane in a few days. Planters throughout the State show intense interest, and have strong faith in the new specimens. We shall send some of the cane to the Experiment Stations in Cuba and the Hawaiian Islands.

In the following issue of the Queensland *Agricultural Journal* reference is made to the excellent results obtained by Mr. E. Grimley with West Indian seedling canes (see *Agricultural News*, Vol. III, p. 180), and it is stated:—

It will be seen that the ideal sugar-cane is B.147, giving 23·40 per cent. of crystallizable sugar. B.208 is another splendid sugar-yielding cane, and both are evidently superior to T. 74, notwithstanding the weight of cane per acre produced by the latter is 38 tons, and of the West Indian varieties, 30 tons. In Queensland, this weight will doubtless be exceeded.

* We presume that this is a mistake. The canes referred to are undoubtedly D. 95 and D. 74. (See *Agricultural News*, Vol. II, p. 323.)

ADULTERATION OF CITRONELLA OIL.

The report for 1903 of the Director of the Royal Botanic Gardens, Ceylon, contains the following reference to the decline of the citronella oil industry owing to adulteration and to efforts that are to be made to check this:—

The heaviest fall is in citronella oil, amounting to over 230,000 lb., or 18 per cent. This, following a fall of 140,000 lb. in the previous year, indicates that the industry is on the decline, as was predicted in previous years, land going out of cultivation. Adulteration is chiefly responsible for this state of things, though there has also been over-production. The drop in exports has caused a rise in price to 1*s.* 1*d.* or 1*s.* 2*d.* per lb. The cultivation continues to extend in Java, and the pure oil thence exported is preferred by consumers.

Mr. Bamber, the Government Chemist, has been occupied with this question for some years, as mentioned in previous reports, and his investigations have lately been crowned with success. He has devised a test which is easily workable, and which shows in a few minutes the exact percentage of adulterant contained in any given sample of oil. Applications of this test to samples of export oils have shown that very large quantities of adulterant are often used. Schimmel's test, the only one hitherto employed, is in any case less satisfactory, is more difficult to carry out, and is very often not properly managed by those using it. Proposals are being formulated to have an official examination of all exported oils made at the ports, no oil being allowed to go out of Ceylon except under a Government certificate as to its composition as tested by Bamber's test. In this way we may hope to see this important industry once more set upon its feet, and the decline checked, which would otherwise apparently lead to its almost total extinction, for it seems hopeless to expect the native cultivators and dealers to refrain from adulteration unless compelled, even though it be killing the industry.

Particulars of this recently devised test are given in the following extract from the Government Chemist's report:—

A large number of experiments have been made with pure and adulterated citronella oils to devise a method of detecting or estimating adulterants in the citronella oil. The following process has been found very successful, and depends on the greater solubility of the citronella oil than the adulterants in alcohol of known strength, when the oil has been previously mixed with a vegetable fatty oil. The test is carried out as follows:—Two cubic centimetres of pure, fresh cocoa-nut oil, free from acid, are measured into a graduated tube, then 2 cubic centimetres of the citronella oil to be tested, and both mixed. Twenty cubic centimetres of 83 per cent. alcohol are then added and the tube shaken for one minute. The tube is then placed in a Leffman-Beam or similar centrifugal machine and whirled for about one minute, when the tube is removed and the volume of cocoa-nut oil, plus the adulterant, read off. The graduations of the tubes, pipettes, etc., must be accurate, and the estimation made at a temperature of about 80° F. A pure citronella oil can be kept as a standard and occasionally tested in the above manner, when the reading should be exactly 2 cubic centimetres, or the amount of cocoa-nut oil added. Since this test has been devised for detecting adulteration with mineral and fatty oils, a new adulterant has quite recently been found in the form of spirit. This form of adulteration can be detected by other means, and the question is now being worked out.

WEST INDIAN FRUIT.

PACKING ORANGES FOR THE ENGLISH MARKET.

The *Cyprus Journal* for May contains an article in which the following hints on packing oranges for the English market are given by a well-known firm of fruit brokers :—

Divide the oranges, keeping the rounds from the ovals, and pack each kind separately. This is absolutely necessary.

Grade the oranges into three to five sizes and pack each size separately. This also is absolutely necessary.

Pack the cases so that each case shall contain an equal number of equal-sized fruit, and on the end of the box brand the number of oranges contained therein.

When branding the boxes state if they contain *round* or *oval*. It is of no use to pack both round and oval in the same box.

In packing see that each orange is firmly placed so that it is not shaken loose when the case is handled.

One of the several important reasons why the oranges in each case should be of equal size is to enable the retailers, who sell to the public at a certain rate, to give equal-sized fruit to their customers.

The large fruit is preferred, as heavy supplies of small fruit are received from Spain, and prices rule much lower for these than for large fruit. Attention should, therefore, be given to large fruit, and by preference to ovals, and exporters should, as much as possible, avoid shipping small oranges. The round orange has to compete with those from Valencia and Sidon.

CHINESE BANANAS.

The following note appeared in the *Journal of the Jamaica Agricultural Society* for June :—

After the storm of November 1899, and the hurricane of August last, when so much damage was done to bananas, we called attention to the dwarf banana (*Musa Cavendishii*) commonly called here the Chinese banana, and its stout, wind-proof growth. It easily withstood the rain and wind-storm of November 1899, it even withstood the hurricane of August ; and both times a good quantity of this variety was under our personal observation. In Fiji, where the people have always depended largely upon the banana for food, and which now supplies the Australian and New Zealand markets with this variety, the introduction of the dwarf banana in place of the imposing-looking tall varieties saved the people from being sometimes on the verge of famine, as they formerly were, through losses by storms recurring at short intervals. This variety is said not to keep as well as the Martinique : we have not found it so. It grows better on poorer soils and does not require so much moisture. It certainly does not sucker so profusely as the Martinique ; but is not that an advantage, so long as it gives a succession of one or two, which it never fails to do? It can be planted 6 feet apart. At present our market in the United States does not want it, although it is the variety which goes from Hawaii to San Francisco and supplies the Pacific coast of North America. But in the British markets it is preferred, because it is the kind which has been and is now being supplied from the Canary Islands and is now also being shipped in small quantities, and successfully, from Barbados. The dwarf banana ought to be taken up and cultivated by those who would make a specialty of supplying the British market. It can be grown on this plan with a far more moderate supply of water than the Martinique. A systematic test of the dwarf banana should be made.

AGRICULTURE IN THE BAHAMAS.

We extract the following notes from the United States *Consular Reports* for March 1904 :—

Fruit Trade.—The crop of pine-apples was fairly good, prices ranging rather lower than usual. More than $150,000 worth was shipped to the United States. There was some increase in the number preserved. Some guavas were also preserved. The orange and grape fruit came into market later in the season. The quantity of grape fruit is increasing. A destructive hurricane has just passed over this colony, which will seriously injure the orange and grape fruit crops for the ensuing fall.

Hemp Trade.—The increase in the quantity of hemp produced is quite marked, and this industry will continue to prosper. Over $100,000 worth was exported, mostly to the United States, during this period.

Agriculture.—Although considerable is done in the way of agriculture, there is little in the sale or use of machinery, the soil being altogether too rough and rocky. The implements in use are of an old-fashioned kind.

Sponge Industry.—The sponge industry continues to be the most important business of the colony, and the amount taken by the United States maintained about its usual proportion, reaching some $275,000 per annum. The trade was, for a portion of 1902, rather dull, but during the first six months of 1903 it began to recover.

COTTON NOTES.

Cotton Growing in the West Indies.

Under the auspices of the Liverpool Chamber of Commerce a large meeting was held on July 6 at the Exchange Station Hotel for the purpose of hearing addresses by Sir Gerald Strickland, K.C.M.G., and Sir Daniel Morris, K.C.M.G., on the possibilities offered by the West Indies for cotton growing. Sir Alfred Jones, K.C.M.G., presided.

Sir Gerald Strickland pointed out that in the West Indies there was much land, which was not suitable for sugar-cane cultivation, which might be utilized for cotton growing. He referred to the fact that up to a comparatively recent time sugar had been the main industry in the Leeward Islands. It was desirable to establish a cotton industry side by side with sugar.

In the course of his address Sir Daniel Morris made the following remarks, for a report of which we are indebted to the Liverpool *Mercury* of July 7 :—

Next year they hoped to have 8,000 to 10,000 acres under cotton. In addition to Sea Island cotton seed, they put in Egyptian cotton seed, and they also planted native cotton. In spite of the bad quality of the seed they sowed last year, the price they received this year for their cotton was very favourable indeed. The greater part of cotton from Barbados—the best qualities—was fetching 15*d*., 16*d*., and 16½*d*. per lb., whilst one bale of the same cotton had fetched 1*s*. 6*d*. per lb. This showed that, where they got good seed and proper cultivation, they were obtaining good returns. They hoped, before many years had passed, that the West Indies would export 20,000, 30,000, and up to 50,000 bales of cotton to this country. They had there an organization in the Department of Agriculture which could assist and advise the planters what to do. He said those who proposed to have any dealings with the West Indies at the present time could rest assured that the prospects of investment of capital were as good as in any part of the world.

Cotton Growing in Jamaica.

We extract the following from the report of the usual monthly meeting of the Jamaica Board of Agriculture as published in the *Gleaner* of July 20:—

The report of the sub-committee appointed to inquire into the cotton industry was submitted. It recommended that the Board should do all in its power to bring forcibly to the notice of the Government the advisability of pushing this industry with all its resources, especially in fostering the industry in the plains of St. Elizabeth where little that can be exported is produced at present. The committee also recommended that the Board should get in close touch at once with the British Cotton Growing Association and impress on them the capabilities of Jamaica for growing cotton, that the people are awakening to the importance of the industry, the results of experiments so far as gone, and the price of Jamaica cotton already marketed.

The matter of cotton growing in the parish of St. Elizabeth has been enthusiastically taken up by the local branch of the Jamaica Agricultural Society. The Travelling Instructor is to visit certain districts of the parish to report upon their suitability for cotton growing.

St. Vincent Cotton Growers' Association.

We learn from the *Sentry* that in response to the invitation of the Acting Administrator a meeting of gentlemen interested in agriculture was held at St. Vincent on July 27, at which it was decided to form a Cotton Growers' Association in order to have a recognized local body to watch the interests of cotton growers.

The officers of the association are—Mr. Alexander Smith, Chairman; Mr. J. G. W. Hazell, Treasurer; and Mr. W. N. Sands, Secretary.

The following resolutions were carried :—

1. Resolved that this meeting considers that it is desirable to form a local Cotton Growers' Association to protect and further the interests of the cotton industry in this colony.

2. Resolved that, in order to establish such an association as an organized body, growers of cotton and others interested in the cultivation who desire to become members of the association be required to pay an entrance fee of 5*s*. and a monthly subscription of 1*s*. The funds to be applied in such manner as the association may direct. That a President be elected under a working committee one of whom shall be nominated as Chairman, and that a Secretary be appointed.

3. That the Government and Imperial Department of Agriculture be asked to recognize the association as an established body to co-operate in all matters for the advancement of the Cotton Industry.

Cotton Cultivation in Porto Rico.

The following account of experiments in cotton growing in Porto Rico is contained in the *Consular Report* for 1903 :—

Cotton cultivation experienced an active revival all over the island under the auspices of an American firm, which supplied a considerable quantity of seed gratis.

About 10,000 acres are said to have been planted with cotton during the year and to have yielded satisfactorily (some 5,000 bales), both as regards quantity and quality.

The results are pronounced capable of important improvement as soon as the now inexperienced cultivators, pickers, and handlers have mastered the methods of the novel industry.

At present the introducers of the venture contrast the native labour very unfavourably with that in the American cotton fields and ginneries.

Ginneries have been erected at San Juan, and other plants will follow at various points of the island to meet requirements that doubtlessly will be doubled or trebled in a short time.

The sort is Sea Island. To the end of the year cotton to the value of £871 was exported to the United States.

Mr. Vice-Consul Wilson reports on cotton cultivation in the Arecibo district as follows :—

There has been some attempt at planting Sea Island cotton in this district, but the result has not been so satisfactory as was expected, mostly owing to the poor attention given to the fields and the lack of experience in picking, etc. ; however, the reports as to quality and stoutness of the fibre are favourable.

RABBIT KEEPING IN THE WEST INDIES.

In the following further instalment of notes on rabbit keeping in the West Indies Mr. Barclay deals with the subject of the breeding of rabbits :—

BREEDING.

Bucks and does should not be used for breeding until at least eight months old, and nine months is better. Usually in Jamaica does are bred as early as they will do so and have litters at six months old or before. This is wrong and results in deterioration. A doe which seems to be a persistent fighter should at once be fattened and killed for table, but when accustomed to each other young does will not as a rule fight. Young does therefore kept for breeding, can be kept together until of a breeding age. After being put to the buck, and within a fortnight of having young, the young does should be put each in its own separate apartment and disturbed as little as possible. At this time the doe should receive a little extra in the way of food, but not of a fattening nature, like corn. A hard crust of bread is one of the best things and two table-spoonfuls of porridge (oat, wheat or cornmeal) and milk, if this can be afforded. The doe may begin to make its nest a week before she drops, and at this time soft hay or grass should be put in to help the nest making. The doe will take this and make a nest and line it with the soft fur from her breast. She should not be lifted or touched within a week before dropping, and indeed should be handled as little as possible at any time. No curiosity whatever should allow of any one looking in the nest to see how many young ones she has got. Some does are so sensitive that they will desert their young, or even kill them if they are touched or handled. It is a common thing in Jamaica for does to forsake their newly born young, and this is due to their being disturbed too much. The presence of mice or rats will often so startle and annoy breeding does that they will desert their young, or scatter them about the hutch. When the young are dropped the mother ought to get a little extra grain food to help her milk supply. Porridge and milk is best, but a few peas, say half a dozen, previously soaked in water for six hours, are peculiarly strengthening to a suckling doe.

The young rabbits are bare of hair when born and lie enveloped in the fur in the nest, and the mother puts some over them when she leaves them, putting it aside again when she goes to suckle them. At three weeks old the young begin to move about and peep out, and at nights they come out and nibble green stuff—then the supply of this kind of feeding must be gradually increased. At a month old the young rabbits are running about and can eat what the mother gets, and the process of weaning should begin at five weeks. The doe and the young should be separated during the day and only put together during the night for three days; then the mother should only be put back for an hour in the evening and one in the morning for three days; then for half an hour in the evening and one hour in the morning for three days; after that, if she still apparently likes to have them, she should be put with them for half an hour in the evening only for three days; and then the young should be separated entirely. This is better than an abrupt separation. For three to six more days (according to her condition) the doe should be well fed and exercised alone and then put back to the buck.

After weaning and at the age of from six to eight weeks, the young rabbits pass through a stage called the 'moult,' and they should at this period have the best of attention and the best of feeding. Where the rabbits can run out and in without being handled it is much better. The breeders should be exercised, if possible, daily. Some give a run on the grass only once a week. When the time can be afforded boys and girls can overlook the exercising, and I make a strong point in training the dogs to protect rather than molest the rabbits. It is not difficult.

It will also do those young rabbits which are intended for table later on much good to be exercised. Young bucks and does should be separated at the age of three to four months, all depending upon size and precocity, and kept strictly apart thereafter; at the same age the best may be selected for breeding; those not intended to be kept by the owner may be sold or put in the fattening pen, the sexes always apart. From four months old the fattest may be used for table as is convenient. They go on growing, so that delay in eating is always something gained and there is little fear of them dying from being too fat so long as the hutch is roomy and green food is abundant. If the bucks are castrated a lot can be kept together and they thus fatten easily and grow to a larger size than the others.

AGRICULTURAL SOCIETIES.

St. Lucia.

At the annual general meeting of the St. Lucia Agricultural Society, held on Friday, July 8, the Secretary read the annual report, of which the following is a short summary :—

Four general meetings of the society and two meetings of the management committee have been held.

A Berkshire boar of good pedigree was imported in May 1903. The total cost of the importation, £8 1*s.* 9*d.*, was borne by the society. It was placed first at Dennery and afterwards at La Perle, but very little use has been made of it.

A Hereford bull was also imported from Canada, the cost being £34 7*s.* 7½*d.* Its services have been fairly well requisitioned. Grants were made from the funds of the society for the keep of these animals and also for the encouragement of the bee-keeping industry. The results of bee keeping appear to have been profitable.

The subject of cotton growing has largely occupied the attention of the society. In 1903, 500 lb. of Sea Island cotton seed were imported and disposed of by the society. In April 1904, 1,200 lb. of seed were imported through the Imperial Department of Agriculture, but only about 100 lb. have been sold. Upland cotton has also been grown. The extent of land cultivated in cotton has been slowly but steadily increasing.

The British Cotton Growing Association has loaned two gins to the Dennery factory. Through the kindness of Sir Daniel Morris, Mr. Seabrook was able to inspect the gins and put the smaller one in working order. A hand gin has been placed at the Agricultural School by the Imperial Department of Agriculture.

The balance to the credit of the society is £22 11*s.* 1½*d.*

SCIENCE NOTES.

Bread-nut.

Some confusion is apt to arise on account of this name being applied to two plants in the West Indies. It is, however, generally understood to refer to *Brosimum Alicastrum*, although in Barbados and elsewhere the seeded variety of the bread-fruit receives the name 'bread-nut.'

The former of these (*Brosimum Alicastrum*), a native of Jamaica and Central America, is a large tree sometimes reaching a height of 80 feet. It bears a large number of fruits (nuts), known botanically as achenes, which are embedded in a fleshy fruit stalk or receptable. These are cooked and eaten.

Brosimum Alicastrum is also an excellent timber tree, the rich-brown heart wood, which takes a good polish, being much used for flooring.

The leaves and nuts are eaten by horses and cattle. In an article on 'Jamaican Fodders' in the *Bulletin of the Department of Agriculture*, Jamaica, (Vol. I, p. 246), Mr. H. H. Cousins states : 'This is a valuable fodder-product. It is, for a tropical fodder, unusually rich in nitrogenous matter [12·04 per cent. in sun-dried sample] and deservedly holds a high place as a food for stock.'

The other bread-nut tree, which is, as already stated, considered to be a variety of the common bread-fruit, is recorded by Duss in his *Flore phanérogamique des Antilles françaises* as *Artocarpus incisa*, var. *seminifera*. The fruits are about the same size as those of the ordinary bread-fruit, and are covered with spines in much the same way as is the sour sop (*Anona muricata*). They contain a large number of seeds embedded in the pulp, like the seeds of the jack-fruit (*Artocarpus integrifolia*). A single fruit usually contains upwards of forty of these seeds, which have somewhat the appearance of chestnuts, though not quite as large. They are, in fact, roasted and eaten like the chestnut, which they also resemble in flavour.

In Porto Rico, according to Cook and Collins (*Economic Plants of Porto Rico*), this variety is more common than the seedless form of bread-fruit. The tree is commonly called 'castana,' the Spanish name for the chestnut. The seeds 'are frequently sold in the market in a germinating condition and are boiled for a few minutes before eating.'

This tree is by no means common in the West Indies, but a number of seeds have been obtained from a tree growing at Dodds Reformatory, Barbados. These are being distributed to the Botanic Stations throughout the West Indies. It is understood that the seeded variety of the bread-fruit is usually propagated from seeds and not from cuttings of the root as is the case with the ordinary variety.'

EDUCATIONAL.

Agricultural Schools.

The following are the general reports of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.) on the recent half-yearly examinations of the Dominica and St. Vincent Agricultural Schools :—

DOMINICA.

During the half-year eight new boys have been admitted. These have been at the school for periods varying from two to five and a half months. These new boys have taken the junior papers. As might be expected, their work is weak especially in Agriculture and Chemistry ; their Botany is much better. It is impossible to arrange these boys in order of merit, but Cuffy and Prosper, the boys who have been longest at the school, have done the best papers. Roudette deserves commendation for his position next to these, as he is one of the latest admissions.

The senior boys have done good, if not brilliant, papers all through. Richards and Bruney are the weakest : there is but little to choose between the others; Nicholas is the best. The Chemistry papers were the weakest. Some of the lecture-room experiments described appear not to have been understood by the boys; care must be taken, in performing experiments, that the pupils see and understand every detail, and also grasp thoroughly what each experiment proves, and how it does it. The lecture-room teaching should be as practical as that in the field.

There are only three boys in the junior class. Their papers are weak compared with those of the seniors, and there is not much to choose between them; Gachette is rather better than the others.

ST. VINCENT.

Among the seniors the general standard of results is distinctly good, especially in the Agriculture, Botany and Chemistry papers ; the Arithmetic and Geography papers are not quite so good. The best individual papers are Trotman's and Derrick's in Botany, and McMaster's in Arithmetic, all of which are excellent. Trotman has considerably improved his position in this class and his papers are good throughout. Derrick has again done very well, while McMaster and Carr have both improved their positions. Haynes has fallen considerably in the list, though his science papers are very fair. D. Browne has again done comparatively poorly. All the seniors have obtained well over 50 per cent. of the possible marks.

The junior boys have done much better than at the last examination. Yorke and Harry are the best. As in the senior class, the Agriculture, Chemistry and Botany are the best papers. Henderson and Falby, who were new boys at the last examination have done better this time, although their work is, naturally, still much poorer than that of the other juniors. There is little change in the relative positions of the boys from December.

SWEET POTATO MEAL.

The following analysis of sweet potato meal from Grenada has been forwarded by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., who remarks that the sample was well prepared :—

Moisture	5·75
Oil	0·62
Albuminoids *	3·29
Starch, mucilage, etc. **	85·79
Fibre	2·87
Ash †	1·68
	100·00

* Containing nitrogen	0·53
** Containing starch	79·36
† Containing phosphoric acid ...	0·34
† Containing potassium oxide ...	0·51
† Containing sand	—
Value in units	96
Albuminoid ratio ... 1 to	26·5

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 271 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, AUGUST 13, 1904. No. 61.

NOTES AND COMMENTS.

Contents of Present Issue.

Our editorial deals with the shipment of bananas from Barbados. Mention is made of several matters relating to crates and packing which require the attention of shippers.

On pp. 258-9 will be found several interesting notes relating to West Indian seedling canes. Further reference is made to the successful cultivation of B. 147 and B. 208 in Queensland.

Our cotton notes contain a summary of Sir Daniel Morris' speech at Liverpool, references to the progress of the cotton movement in Jamaica and St. Vincent, and a brief report on experiments in Porto Rico.

Mr. Barclay's notes on rabbit keeping are continued on p. 262. Mr. Barclay gives valuable hints in regard to the treatment of rabbits at the time of breeding.

Reports on the examinations recently held at the Dominica and St. Vincent Agricultural Schools are published on p. 263.

The insect notes in the present issue deal with the cotton leaf-blister mite and the orange fiddler beetle. (See p. 266.)

Brief reviews are given on p. 267 on three Department Reports recently issued. These are the annual reports on the Botanic Stations, etc., at Dominica, St. Lucia, and Montserrat.

In his market report Mr. J. R. Jackson gives an interesting note on the satisfactory position of Jamaica ginger in the London market.

Recent Department Publications.

The following publications have recently been issued by the Department and can be obtained of all Agents:—

Dominica: Reports on Botanic Station, Agricultural School, and Experiment Plots (Price, 6d.); *St. Lucia: Reports on Botanic Station, Agricultural School, Experiment Station, and Experiment Plots* (Price 6d.); and *Montserrat: Reports on Botanic Station and Experiment Plots* (Price 3d.).

Short reviews of these publications will be found on p. 267 of this issue.

The reports on the Botanic Stations, etc., at St. Vincent, Virgin Islands, and St. Kitt's-Nevis, are in the press and will shortly be issued.

Cotton Leaf-blister Mite.

We desire to draw special attention to the note on the cotton leaf-blister mite on p. 266 of this issue.

During last season this pest proved a very serious menace to the cotton industry, and there is no doubt that at Montserrat, at any rate, the financial losses on its account were considerable.

It will be seen that with the exception of Barbados and Antigua, the mite has made its appearance in practically all the islands in which cotton is being grown. Fortunately, up to the present, its attacks have not been particularly serious except in Montserrat.

It will therefore be quite obvious that in the leaf-blister mite we have a pest that may prove as serious as the cotton worm.

This being the case, the same amount of precaution and attention will be necessary in combating this pest. Experiments have shown that it can be controlled by the use of a mixture of lime and sulphur. Care must be taken to get the dust on to the young buds as well as the leaves.

Fruit Growing in Porto Rico.

In his report on the trade of Porto Rico for 1903, the British Consul writes of the encouraging prospects of the fruit industry.

About 10,000 acres are devoted to orange cultivation, the more recent portions being worked on most scientific lines. With the advantages enjoyed by Porto Rico in the absence of frost and in the possibility of cheap freight, the island is likely to become an important rival to California and Florida in the production of oranges. The growth of the trade is indicated by the official returns, which show that the export of the present uncultivated oranges has increased in value from £10,273 in 1901-2 to £46,118 in 1902-3.

Though pine-apple growing continues to receive attention, the results, so far, have not been entirely satisfactory, as the variety grown does not appear to ship well. It is anticipated that other fruits, at present grown only for local consumption, will become articles of export as soon as greater facilities for transportation are obtained.

Exports of Dutch India.

In a report on 'American trade with Dutch India' the United States Consul at Batavia, Java, gives an account of the principal exports from his district during 1903. There was an increase of 12,044 tons in the exports of coffee. It is stated that Java coffee ranks among the best coffee in the world, and regret is expressed at the tendency of planters to substitute the cultivation of the more easily cultivated, but lower grade, Liberian coffee. The total value of kapok exported during the year amounted to $492,342. The cultivation of this article is greatly increasing in Java. It is easily cultivated and requires little or no care. A very good yield is about 4 to 5 lb. per tree.

The outlook for sugar production for 1903 was anything but encouraging. The production of tea is gradually increasing, the exports in 1903 being valued at $1,702,313. Other important exports were gum dammar, spices, white wood oil, tapioca flour, and pearl shells.

Grenada Mangos in New York.

In July last his Excellency the Governor of the Windward Islands forwarded two cases of mangos (Ceylon no. 1) to Messrs. H. Hicks & Sons, New York, as an experiment to ascertain the value of such fruit in the New York market. The mangos were shipped in two cases, one going as ordinary freight and the other in the cold chamber. They arrived in excellent condition, those going in the cold chamber being in rather better order and showing a higher colour.

Messrs. Hicks & Sons report that there would be a ready sale for these mangos in small quantities, as they were undoubtedly the best that had ever been in New York. As it would take some time to accustom the people of the north to this fruit, the consumption would not be likely to be rapid enough to warrant large shipments, but they are of opinion that by making small and regular shipments of fruit of the same variety and quality, a trade might be increased. It would be necessary to ship all such fruit in the cold chamber. The price paid for these mangos was at the rate of $1 per dozen; the price for excellent high-coloured fruit from Florida being 20c. per dozen.

Great care was taken in packing the fruit for shipment. Each box had one layer of fruit only; each mango being wrapped in paper and placed closely together *on end* in the boxes. Large holes were bored in the boxes to admit of a free circulation of air.

Agriculture in the Virgin Islands.

A report by the Hon. Francis Watts on a recent visit of inspection to the Virgin Islands gives an interesting and encouraging account of agricultural operations at Tortola.

The cotton ginnery contains a Platt's gin sent out by the British Cotton Growing Association, which is to be worked by an aermotor. Interest appears to have been taken in cotton cultivation especially in Virgin Gorda and Anegada.

The cacao experiment plot at the station has demonstrated the possibility of establishing a cacao industry, and it is anticipated that the peasants will not be slow to follow the example set at the station. Dr. Watts points out that it is an industry eminently suited to a peasant proprietary: no machinery is required, and there should be no difficulties in the matter of a labour supply. The necessity for planting adequate shelter belts will have to be strongly urged.

In a memorandum on 'Reafforestation in the Virgin Islands,' Dr. Watts discusses the possibility of attacking this problem in an indirect manner, seeing that the absence of large landowners, of extensive Crown Lands, and of available funds render it difficult to see how direct reafforestation can be effected. It is suggested that every effort be made to encourage the planting of wind-breaks: as a starting point, the beneficial effects of such planting should be demonstrated at the station.

The planting of trees might also be encouraged by the experimental planting of rubber trees (notably *Castilloa* and *Funtumia*). A demonstration plot might, it is suggested, be started in a ravine, near the station, on land in the possession of the Government.

Exports of British Honduras.

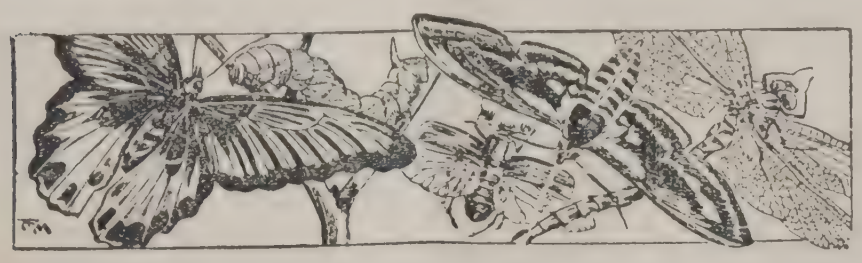
The *Journal of the British Honduras Society of Agriculture and Commerce* for July 1904 contains an interesting review of the position of agriculture and commerce in the colony as shown by statistics published in the *Blue Book* for 1903.

Both the imports and the exports show a decided increase compared with those of the previous year. The trade with the United States has greatly increased, largely due to a brisk demand for timber. The exports of mahogany, which amounted in value to $492,554, have never been exceeded since 1846. Cedar also shows an increase.

The fruits exported include bananas, plantains, and cocoa-nuts; the bananas and plantains were exported in largely increased proportions, but the number of cocoa-nuts decreased, while, owing to better prices, the value increased from $36,865 in 1902 to $47,822 in 1903. It is a matter of congratulation that the colony is ceasing to import cacao, and in addition to providing for home consumption is exporting small quantities. Cohune nuts now appear as a new item on the list of exports.

On the other hand, regret has to be expressed at the great falling off in the exports of logwood and rubber. In 1896, when logwood was valued at £5 per ton, the exports amounted to 34,539 tons valued at $803,636. Last year the value of logwood was about £4 per ton, and only 14,205 tons were exported, valued at $529,333.

'The exports of rubber dropped from 30,338 lb. valued at $114,163 in 1902 to 22,176 lb. valued at $13,002 in 1903. We fear that this decrease may, at least in part, be due to injudicious bleeding of the trees.'



INSECT NOTES.

The Cotton Leaf-blister Mite.

The cotton leaf-blister mite first came to the notice of this Department in July 1903, when affected leaves were sent from Montserrat. In September so much damage was being done in that island by this pest that the Entomologist was sent to investigate and report. At the same time the mite was noticed in St. Kitt's and St. Lucia, and since that time it has appeared in Anguilla, Nevis, Dominica, St. Vincent, and Carriacou. It is, however, now known that the peasants of Carriacou and St. Lucia have long been familiar with the peculiar appearance of the cotton leaves which indicates the presence of the mite, but it had not been considered a serious pest.

The effects of its attack on Sea Island cotton have been serious, and the crop of 1903 was undoubtedly much reduced on account of its ravages.

Experiments have been tried in combating the leaf-blister mite, and as this pest will probably be even more widely spread this year than last, it is hoped that all cotton growers will maintain a sharp look-out for its first appearance and apply remedies at once.

Hand picking of the infested leaves and pulling out and burning badly infested plants have been tried, and careful experiments have been carried on at Montserrat to test the efficiency of several insecticides, of which the following is a list: Lime and sulphur, sulphur and water, lime and sulphur wash, crude Barbados oil and whale oil soap, whale oil soap, and kerosene emulsion. One series of experiments was begun in September at Dagenham estate, one soon after at Grove Station, and another in January at Dagenham. Mention of these experiments will be found in the *West Indian Bulletin* (Vol. IV, pp. 285,337) and the *Agricultural News* (Vol. II, pp. 309,378 ; Vol. III, pp. 42,53 and 154).

So far the experimental work has indicated that the leaf-blister mite can be controlled by the use of sulphur. This can best be applied dry in a mixture with lime, in equal parts, in the manner recommended for the use of Paris green for the cotton worm. The first application of this mixture should be made when the plants are about three weeks old, and subsequent applications at intervals of two weeks.

As the most serious aspect of the injury by the leaf-blister mite is its habit of infesting the young buds, it is necessary to get the sulphur and lime dust upon the stems and buds as well as upon the leaves.

Any plants that have become seriously infested should be taken out and burned. No wild cotton should be allowed to grow near a field of Sea Island cotton as it is now known that wild cotton is sometimes attacked by the leaf-blister mite. Weeds should be kept down and the cotton plants given every chance to make vigorous growth.

These recommendations are based on one year's experience with the leaf-blister mite. It is probable that further knowledge will make it possible to employ better and more economical means against this pest, but for the present the utmost care is necessary to accomplish as much as possible with the information already available.

The Fiddler Beetle of the Orange.

Specimens of the fiddler beetle have recently been received from Mr. John Barclay, Secretary of the Jamaica Agricultural Society. This insect, which is technically known as *Praepodes vittatus*, is one of the snout beetles and is closely related to the lady-bird borer of the sugar-cane (*Diaprepes abbreviatus*), and the golden weevil of St. Vincent (*Diaprepes spengleri*).

These belong to that large family of beetles which have the front of the head prolonged into a snout or beak. There are many species in the tropics, most, if not all, of which are injurious to vegetation in both larval and adult forms. In the *Bulletin of the Department of Agriculture*, Jamaica, November 1903, p. 249, Mr. E. Stuart Panton gives an account of the life-history and habits of the fiddler beetle as well as figures of the larva and male and female adults. This insect is a pest of the orange, and much damage has been attributed to it in the orange cultivations of Jamaica. The larva feeds on the orange root, while the adult feeds on the leaves and fruit. The damage by the larvae is much more severe than that done by the adults.

The male is black with two bright-red longitudinal stripes on the wing covers, and between these a white stripe down the middle of the back. The female is generally more or less covered with whitish scales, which make the longitudinal stripes less conspicuous. The male is about $\frac{3}{4}$ inch and the female about $\frac{7}{8}$ inch in length.

Following the article on the fiddler beetle is one, also accompanied by figures, on the black wasp (*Elis atrata*) which is predaceous on the grub of the beetle. This wasp was mentioned in the *Agricultural News* (Vol. II, p. 244), and is closely related to a wasp which is very common in Barbados, viz., *Dielis dorsata*.

The lady-bird borer of the cane (*Diaprepes abbreviatus*) is the subject of a paper in the *West Indian Bulletin* (Vol. IV, p. 37), which gives the life-history of this insect in detail, but does not mention any food of the adult, which is slightly smaller than the fiddler beetle. An added note however, mentions that the adult causes serious injury to the guava in Porto Rico.

This is a greenish-white insect with pale-brown longitudinal stripes on the wing covers. *Diaprepes spengleri* is about the size of *D. abbreviatus*, but the colour is a bright golden-yellow in fresh specimens, and a dull greyish-white when the golden-yellow scales have been rubbed off. The longitudinal stripes are dark reddish-brown. The adult feeds on a variety of plants, among which are the leaves of citrus trees, cabbages, etc. (See *Agricultural News*, Vol. II, p. 280; Vol. III, p. 203.)

No record is at hand of the food of the larva of the golden weevil, but it is probably a root feeder.

EGGS AND POULTRY IN BERMUDA.

The imports of eggs and poultry seem to be inexplicable considering the ease with which poultry can be raised here. In 1902 there were imported in eggs alone some $8,000 worth and poultry in proportion, and this was done even with a duty on eggs, recently imposed, of 6c. per dozen. The price of this commodity never goes below 30c. per dozen and that for a short time only, soon rising to 50c. or 60c. per dozen. It would seem that here is an opportunity for some skilled and enterprising man to establish a paying business.

I am continually receiving letters asking for information as to business conditions in this market and will be glad to give details as to a poultry farm to anyone who may desire it. (U. S. *Consular Reports*, March 1904.)

ST. LUCIA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL AND EXPERIMENT PLOTS, 1903-4.

Botanic Station.—The expenditure during the year ended March 31, 1904, was £812 10*s.* 11*d.* The receipts from the sale of plants, which amounted to £56 0*s.* 3*d.*, again showed an increase.

The increase in the number of plants distributed, to which reference was made in the report for 1902-3, was not maintained. There was, however, a large increase in the amount of seed distributed from the station.

Agricultural School.—The total expenditure under this head, including the Windward Islands Agricultural Scholarship, amounted to £680 3*s.* 1*d.*

All the vegetables and farine, and some of the dried beans used at the school were produced in the plots. It is estimated that this effected a saving of about £34.

Satisfactory results were obtained at the two half-yearly examinations, and it is reported that the boys have shown interest in their studies.

A large number of economic plants have been grown in the experiment plots. In addition to vegetables, cacao, oranges, kola, cotton and other crops have been grown, in most cases with satisfactory results.

Experiment Plots in Country Districts.—The Agricultural Instructor has had charge of five of these plots.

At the Rivière Dorée station interesting experiments have been carried out with different varieties of cotton, including Sea Island, small green-seed Upland, and the native black-seed. The manurial experiments with cotton demonstrated the advantage of applying 1 cwt. of sulphate of ammonia one month before flowering.

The other experiment plots—Soufrière, Dennery, Roseau, and Castries—are devoted to cacao. These plots, which were taken over in a more or less unhealthy condition, have been forked, weeded, pruned, and manured. This treatment has resulted in greatly increased yields.

These reports are, on the whole, of a satisfactory nature and indicate that the officers concerned have continued to carry out their duties in a faithful and conscientious manner.

MONTSERRAT: ANNUAL REPORTS ON THE BOTANIC STATION AND EXPERIMENT PLOTS, 1903-4.

Mr. Jordan's report deals with the working of the Grove Botanic Station and the two out-stations at Olveston and Harris'.

The expenditure for the year amounted to £568 11*s.* 5*d.* The sale of plants and produce yielded £45 17*s.* 9*d.*

Large numbers of new plants were placed in permanent positions during the year. There was a large increase in the number of plants distributed from the station.

The report gives full details as to the experiments that have been carried out at the stations. These experiments should be useful in demonstrating to peasant proprietors the best methods of cultivation.

A record is given of the experiments carried out to ascertain the best way to control the leaf-blister mite, which proved such a serious pest to cotton last season. Good results have been obtained with a mixture of sulphur and lime. The interest of the residents in the island has been maintained, and the officers of the Department gave their assistance in the organization of an Agricultural Show and an Arbor Day celebration.

This report also contains a record of the work done by the Local Instructor, who furnishes interesting details as to recently introduced minor industries.

DOMINICA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL AND EXPERIMENT PLOTS, 1903-4.

Botanic Station.—The report deals with the working of the station during the year ended March 31, 1904. Among the buildings erected during the year may be mentioned the fumigation chamber for the treatment of imported plants. Additional land near the Roseau Bridge was fenced in and will be used as a nursery.

The number of plants distributed was 53,500: there was a decrease in the number of lime plants distributed, but, on the other hand, increased demands for cacao, rubber, nutmeg, and orange plants are reported.

A number of interesting notes are given on various economic plants grown at the station.

The report shows that work of a useful and satisfactory nature has been carried out by Mr. Jones during the year.

Agricultural School.—In his report Mr. Brooks, who succeeded Mr. Tannock in June 1903 as Officer-in-charge, states that the expenditure for the year under review amounted to £525. The receipts from sale of vegetables, eggs, service of stallions, etc., were £23 13*s.* 3*d.*

The health of the boys was satisfactory, the Medical Officer reporting that they have improved in physique since their admission into the school.

Good results were obtained in the two half-yearly examinations. The number of boys at the school at the end of the year was eighteen.

A large variety of food and fodder crops was grown in the experiment plots. In addition, experiments were carried out with cotton, rubber, citrus plants, pine-apples, ginger, etc. The results of the experiments were satisfactory, and the growth of vegetables reduced the expenditure on food by £21 17*s.*

The live stock at the school are reported to be doing good service. It is evident that Mr. Brooks is making an earnest endeavour to continue the satisfactory work commenced by his predecessor.

Experiment Plots.—The Agricultural Instructor's report deals with his work in connexion with the experiment plots in the country districts.

Seven cacao experiment plots were worked during the year. The results appear, on the whole, to have been satisfactory, increased yields being reported in most cases. The cacao suffered considerably on some plots from the gale of August last.

An orange plot of 2 acres was started on Corona estate with plants obtained from Jamaica.

Two lime plots—one at Hillsborough, and the other at St. Aroment—were treated with manures.

Eight hundred and seventy-two rubber plants were put out along the Imperial Road.

GLEANINGS.

Mr. Barclay has reported that the great display of corn and peas at the recent Mount James show was owing to the seeds distributed in connexion with hurricane relief. (Jamaica *Leader*, July 22.)

A lecture on cotton growing, illustrated by lantern slides, was given by the Hon. F. Watts at the Anglican School room, Roadtown, Tortola, on July 11. There was a large and appreciative audience.

In his annual report the Government Analyst of British Guiana, Professor Harrison, states that the variations in the composition of molascuit show that the exercise of more skill in preparation is very desirable.

A bunch of fruit of the date palm (*Phoenix dactilifera*) was received by last mail from Trinidad. Mr. Hart states that this was one of twenty similar bunches on the same tree. The dates, though rather small, were of good flavour.

Mr. J. H. Hart, F.L.S., also forwarded to the Imperial Commissioner of Agriculture specimens of the so-called seedless limes. He states that though he has found a seed in a fruit from the same tree, most of the fruits are entirely free from seed.

The grade of copra in this section [Tahiti] is excellent, and the demand has recently increased from Europe and Australia, while the San Francisco market will shortly require a large quantity of this high-grade product. (U.S. *Consular Report.*)

A meeting of the council of the British Honduras Society of Agriculture and Commerce was held on June 17. Among the matters discussed were the trade in cohune nuts, the Society's *Journal*, and the bee-keeping industry. It was decided to publish the *Journal* quarterly, and to issue it free to members.

The chief news of the fortnight is the issuing of the new contracts by the Central Factory Company, under which the cane-deliverers are to have 6 lb. sugar per 100 lb. canes and a proportionate share of the molasses as well as the continuation of the former privileges in regard to megass and filter press stuff. (St. Croix *Avis.*)

The second biennial agricultural show, in connexion with the Wakenaam Farmers' Association, was held at Good Success, British Guiana, on August 1. According to the report of the show in the *Argosy* of August 3, the exhibits were, on the whole, disappointing. An Agricultural Show was also held at West Bank on the same day. The exhibits were considered creditable.

During the fortnight ended July 14, 520 bales of West Indian cotton were imported into the United Kingdom, sales being effected at the following prices: West Indian, 5·38*d.* per lb.; West Indian Sea Island, medium fine, 14¼*d.*; fine, 15*d.*; extra fine, 16*d.* per lb. (*West India Committee Circular.*)

At the annual general meeting of the St. Lucia Agricultural Society held on July 8, it was agreed to offer a prize of £5 for the best school garden attached to a primary school of the island. The prize is to be divided as follows: £2 for the teacher, £2 for the school, and £1 among the children.

The Agricultural Superintendent at St. Vincent reports that during the season, April 6 to July 23, the total amount of cotton ginned at the factory was 43,654 lb., made up of 36,105 lb. of Sea Island and 7,549 lb. of Upland cotton. The shipments amounted to 114 bales of Sea Island and 26 of Upland cotton.

The quantities of fruit imported into the United Kingdom from the British West Indies during the year 1903 were as follows: grapes, 253 cwt.; lemons, 854 cwt.; oranges, 63,834 cwt.; pears, 45 cwt.; bananas, 682,883 bunches; unenumerated, 11,470 cwt. There were also imported 127,835 cwt. of nuts, and 218 cwt. of potatos.

Tubers of a wild variety of arrowroot were recently received from Messrs. Powell Bros., Suva, Fiji. On being analysed at the Government Laboratory, Barbados, they were found to contain 27·98 per cent. of starch. The composition of these tubers was very similar to that given for Jamaica arrowroot in the *Agricultural News* (Vol. 1, p. 75), except that the percentage of fibre is much lower in the Fiji variety.

In our last issue (p. 251) we gave particulars of a scheme for the employment of apprentices in connexion with agricultural work in British Guiana. We learn from the *Argosy* of August 3 that, in accordance with the provisions of this scheme, six young men have been enrolled as apprentices. Three are engaged in the cane experiment fields and three in the nursery.

According to the *Consular Report* on Porto Rico for 1903, experiments in growing tobacco under cover were extended with marked success as regards both quantity and quality. The shade-grown acreage will be considerably increased. Tobacco growing under the ordinary system is also being extended. The value of the exports during 1902-3 was: leaf, £38,371; cigars, £350,783.

The Agricultural Instructor at St. Lucia reports: 'There are now 250 colonies of bees in St. Lucia in modern hives, all being run for extracted honey. This is an increase of 100 per cent. within the past year. The past season has proved an exceptionally poor one, but at the time of writing honey shipments are now commencing to go forward. The industry is now firmly established and may be expected to increase steadily.'

In a review on *Bulletin* No. 98 of the Maine Experiment Station in the *Experiment Station Record*, it is stated that the results are given of tests in the efficiency of various materials, including kainit, gypsum, acid phosphate, and sawdust for preserving pen manure. 'Both kainit and acid phosphate prevented practically all loss of nitrogen. The gypsum was somewhat less efficient. The use of sawdust materially improved the mechanical condition of the manure.'

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report on the London drug and spice market for the month of June:—

Extreme quietness and, in some weeks, a decided dullness, have again characterized the markets, a condition that, in view of the summer holidays which at the time of writing have commenced, is not likely to improve till autumn again sets in. Of all drugs camphor is perhaps the most carefully watched, but still remains depressed.

With regard to West Indian products, the following notes will show that quantities and prices have been quite normal:—

SARSAPARILLA.

At the sale on June 2, Mexican was reported scarce both in London and New York. The arrivals in London were stated to include 52 packages of grey Jamaica, 14 of Lima and 9 of red native. Honduras was in fair demand, 1*s.* 3*d.* per lb. being asked for good; 1*s.* 1*d.* for ordinary and 1*s.* for common rough. A week later when the 52 packages of grey Jamaica were put upon the market, they were disposed of at from 9*d.* to 1*s.* per lb. according to quality, sea-damaged fetching 8½*d.*; fair Lima sold at from 10*d.* to 11*d.*, and native Jamaica from 7*d.* to 8*d.*; fair red, 10*d.* and pale reddish, 9*d.* At the last sale prices had somewhat improved, grey Jamaica being quoted at 1*s.* to 1*s.* 2*d.*; good Lima at 11*d.* to 1*s.*, and good Honduras at 1*s.* 3*d.* per lb.

GINGER.

At the first sale of the month, on the 8th., a large quantity of Jamaica was offered. A small proportion of this sold at rates from 45*s.* to 48*s.* for qualities including good; ordinary dark fetching from 32*s.* to 33*s.*; good small cut Cochin was bought in at 35*s.*, and good bold Calicut at 30*s.*; fair washed Cochin sold at 18*s.* 6*d.* to 19*s.*, and cuttings at 14*s.* 6*d.* to 15*s.*; small mixed Japan was sold without reserve at 17*s.*, and mouldy at 15*s.* to 15*s.* 6*d.* A week later, when 523 barrels of Jamaica were offered, somewhere about half the quantity was disposed of at lower prices, the quotations being 44*s.* 6*d.* to 45*s.* for good; 41*s.* to 43*s.* 6*d.* for fair washed; 36*s.* 6*d.* to 40*s.* for medium dullish, and 32*s.* to 35*s.* for ordinary to ordinary dullish. At the same sale 126 packages of Cochin were offered, and 27 sold at the following rates: 31*s.* for small, medium and bold cut; 16*s.* for fine cuttings, and 18*s.* 6*d.* to 20*s.* for fair to good washed, rough. At the next sale, on June 22, prices remained about the same for ordinary qualities, but for good bright plump in half-barrels 59*s.* 6*d.* was obtained, and in cases, 55*s.* Though fair supplies of Calicut and Cochin were offered the demand was not brisk and the sales effected were at somewhat lower rates. Bold, roughly cut, and scraped and limed, however, sold at 55*s.* At this same sale fair limed Japanese was sold without reserve at 16*s.* 6*d.* At the last spice sale, on June 29, when 857 barrels of Jamaica ginger were offered, 100 were sold publicly and a fair quantity disposed of privately. The prices realized were as follows: fair bright to good washed, 44*s.* 6*d.* to 46*s.*; middling to good middling, 40*s.* 6*d.* to 43*s.* 6*d.*; ordinary bold dull, 34*s.*; and dark, 31*s.* to 32*s.* There was but little demand for Cochin and Calicut, though sales were made privately for fair washed rough Cochin, at 19*s.*

It will be seen that we have gone somewhat into detail with regard to the comparative prices of ginger from Jamaica and other sources, and it will be noted with satisfaction that there has of late been an upward tendency and preference for the Jamaica product.

ARROWROOT.

At the first spice sale some 700 barrels of good manufacturing St. Vincent were disposed of privately at 1¾*d.* per lb. and at auction at 1⅝*d.*, fine realizing 3*d.* per lb. There was but little or no change in these prices throughout the month, but at the auction on June 22 pearl, in tins, was offered and bought in at 3½*d.*, and in barrels, at 2½*d.* At the last sale, on the 29th., there was absolutely no demand, and of the 317 barrels of St. Vincent offered none were sold.

PIMENTO, NUTMEGS AND MACE.

Pimento began the month with very little demand at prices varying from 3*d.* to 3⅛*d.*, and at the last sale out of 260 bags offered, about 30 were sold at the previous rate.

Of nutmegs and mace, at the sale on the 22nd., West Indian nutmegs were reported steady and mace quiet, a few packages selling at 1*s.* 5*d.* to 1*s.* 6*d.* for fair pale reddish. These conditions continued, and at the last sale of 227 packages offered, the bulk were sold. At this last sale 52 packages of West Indian mace were sold at from 1*s.* 7*d.* to 1*s.* 8*d.* for good bold pale; 1*s.* 5*d.* to 1*s.* 6*d.* for good pale and reddish; 1*s.* 3*d.* to 1*s.* 4*d.* for fair red; and 1*s.* 1*d.* to 1*s.* 2*d.* for broken.

CASSIA FISTULA, TAMARINDS, ETC.

Cassia Fistula pods from Dominica were offered at the first drug sales on June 9: 39 packages were offered, of which 7 were sold at 26*s.* per cwt.

A large supply of tamarinds was also offered, fair Barbados fetching 9*s.* 6*d.*, and ordinary dry Antigua, 6*s.* 6*d.* to 8*s.* 6*d.* per cwt. in bond.

A box of ordinary musk seed from Grenada sold at 7*d.* per lb., one of bay oil from Montserrat, 6*s.* 3*d.* per lb., and one of West Indian distilled lime oil, 1*s.* 7*d.* per lb.

In the middle of the month 'good unracked' West Indian lime juice fetched 1*s.* 6*d.* per gallon.

No quotations have been given for West Indian kola, but good bright Ceylon was offered at the close of the month at 5*d.* per lb., 6 packages being disposed of out of 11 offered. At Liverpool 8 bags of dry nuts were sold at 3*d.* per lb. and a small portion at 2½*d.*

DEPARTMENT NEWS.

At a congregation of the University of Birmingham, which took place on July 9, the degree of D.Sc. was conferred upon the Hon. Francis Watts, B.Sc., F.I.C., F.C.S., Government Analytical and Agricultural Chemist for the Leeward Islands.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, having completed his visit of inspection to the Northern Islands, returned to Barbados in the R.M.S. 'Esk' on July 30.

The Secretary of State for the Colonies has approved of the provisional and temporary appointment of Mr. J. S. Hollings as Agricultural Instructor at Nevis.

MARKET REPORTS.

London,—July 19, 1904. Messrs. J. Hales Caird & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' July 15, 1904; and 'The Public Ledger,' July 16, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* per lb.
Balata—1/3 to 2/- per lb.
Bees'-wax—£7 10*s.* to £7 17*s.* 6*d.* per cwt.
Cacao—Trinidad, 58/- to 71/- per cwt.; Grenada, 52/- to 58/- per cwt.; Dominica, 51/- to 54/- per cwt.; Jamaica, 49/- to 56/- per cwt.
Cardamoms—Mysore, 7*d.* to 3/3 per lb.
Coffee—Jamaica, good ordinary, 36/- to 37/- per cwt.
Cotton—West Indian Sea Island, 14¼*d.* per lb.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, common to middling, 33/- to 38/6; good fair bright, 45/- to 50/- per cwt.
Honey—Dark to good bright liquid, 15/- to 20/- per cwt.
Isinglass—West Indian leaf, 2/- to 3/- per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/3 to 1/4 per gallon; concentrated, £13 10*s.* to £14 per cask of 108 gallons.
Lime Oil—1/6 per lb., distilled.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Fair to good pale, 1/3 to 1/5; red, 1/2 to 1/3 per lb.
Nitrate of Soda—Agricultural, £10 2*s.* 6*d.* per ton.
Nutmegs—66's, 1/9; 86's, 1/-; 94's, 9½*d.*; 114's, 7½*d.*; 127's, 6*d*; 150's, 5½*d.* per lb.
Pimento—3*d.* to 3 1/16*d.* per lb.
Rum—Demerara, 7*d.* to 7½*d.* per proof gallon; Jamaica, 1*s* 9½*d.* per proof gallon; Leewards, 7*d.* to 10*d.* per proof gallon.
Sarsaparilla—Jamaica, 7*d.* per lb.
Sugar—Crystallized, 15/9 to 16/9 per cwt.; Muscovado, St. Vincent, 13/3 to 13/6 per cwt.; 89°, 9*s.* 6*d.* on floating terms; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£12 2*s.* 6*d.* per ton.

Montreal,—July 9, 1904.—Mr. J. Russell Murray. (In bond quotations.)

Bananas—Jamaica, $1·10 per bunch of 8 hands; $1·50 per bunch firsts; $1·75 per bunch Jumbos, c. & f.
Cacao—Jamaica, 11c. to 12c. per lb., c. & f.
Cedar—Trinidad, 40c. per cubic foot, c.i.f.
Cocoa-nuts—Jamaica, $24·00 to $26·00; Trinidad, $21·00 to $23·00 per M., c. & f.
Coffee—Jamaica, medium, 8½c. to 9½c. per lb., c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb., c. & f.
Limes—Jamaica, $6·00 per barrel, c. & f.
Molascuit—Demerara, $1·32 per 100 lb., c. & f.
Molasses—Barbados, 22c. to 25c.; Antigua, 19c. to 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 17c. to 18c. per lb., c. & f.
Pimento—Jamaica, 8c. to 8¼c. per lb., c. & f.
Sugar—Grey Crystals, 96°, $2·50 to $2·60 per 100 lb., c. & f.
—Centrifugals, 89°, $2·15 to $2·25 per 100 lb., c. & f.
—Molasses, 89°, $2·00 per 100 lb., c. & f.
—Barbados, 89°, $2·25 per 100 lb., c. &. f.

New York,—July 22, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¼c. to 13c.; Jamaica, 9¾c. to 11½c.; Grenada, 12c. to 12½c.; Trinidad, 12c. to 13½c. per lb.
Cocoa-nuts—Trinidads, $21 to $23 per M., selected. Jamaicas—$25 to $27.
Coffee—Jamaica, fair to good ordinary, 7c. to 7⅞c. per lb.
Ginger—Jamaica, 6½c. to 8c. per lb.
Goat Skins—Jamaicas, 52c. to 54½c. per lb.
Pimento—5¾c. per lb., spot quotation.
Sugar—Centrifugals, 96°, 3 15/16c. to 4c.; Muscovados, 89°, 3½c; Molasses, 89°, 3¼c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 27, 1904.—Messrs. Bennett Bryson & Co., Ltd.

Molasses—No quotations.
Sugar—$1·92½ per 100 lb.

Barbados,—July 30, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·40 to $3·50 per 100 lb.
Cacao—Dominica, $13·00 per 100 lb.
Cocoa-nuts—$10·75 per M. for husked nuts.
Coffee—Jamaica, $9·00 to $10·00; ordinary Rio, $11·00 per 100 lb.
Hay—$1·20 per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $73·00 to $75·00; Sulphate of potash, $67·00.
Molasses—13c. per gallon (puncheon included).
Onions—Madeira (stringed), $2·10 per 100 lb.; Teneriffe, $1·19 to $1·25 per 100 lb.
Potatos, English—$1·80 to $1·87 per barrel.
Rice—Ballam, $4·50 to $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
Sugar—in hhds., 89°, $1·90 (packages included). Dark Crystals, 96°, $2·25 to $2·30 per 100 lb.

British Guiana,—July 28, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $8·00 to $8·50 per barrel.
Balata—Venezuela block, 25c. to 30c.; Demerara sheet, 40c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$7·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 12½c. to 13c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—$4·40 to $4·50 per bag of 168 lb.
Eddoes—60c. to 84c. per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—$1·80 to $2·00 per 100 lb., ex 'Indus'; Teneriffe, 1¼c. to 1½c. per lb.
Pea Nuts—Curaçoa, 4c.; American, 5¾c. to 6c. per lb. (retail).
Plantains—20c. to 32c. per bunch.
Potatos, English—$3·00 per barrel (retail).
Rice—Ballam, $4·50; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·00 per barrel, 80c. per bag.
Tannias—$1·20 per barrel.
Yams—Buck, $1·44 per bag.
Sugar—Dark Crystals, $2·25; Yellow, $2·50 to $2·60; White, $3·50 to $3·75; Molasses, $2·00 to $2·15 per 100 lb.
Timber—Greenheart, 32c. to 34c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—July 28, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary, $12·15 to $12·25; Estates, $12·25 to $12·35; Venezuelan, $12 50 to $12·80 per fanega (110 lb.).
Cocoa-nuts—$17·00 per M., f.o.b.
Cocoa-nut Meal—1¼c. per lb.
Cocoa-nut Oil—70c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·70 per 100 lb.
Onions—$1·02 to $1·60 per 100 lb.
Potatos, English—$1·25 to $1·80 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $5·50 to $5·75 per bag.
Sugar—White Crystals, $2·20 to $3·25; Molasses Sugar, —No quotations.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 62. BARBADOS, AUGUST 27, 1904. PRICE 1*d.*

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Wind-Breaks or Shelter-Belts.

IN many of the West India Islands, more especially those which deforestation has caused to become wind-swept, one of the most urgent requirements, from an agricultural standpoint, is the protection of estates and peasants' provision grounds from the wind. This can be effected by the planting of rows of suitable trees as wind-breaks or shelter-belts.

When the principal crop of such islands was the sugar-cane, and when the peasants were content to grow canes and ground provisions, there was but little need for this protection. Now, however, that other industries are being introduced, when planters and peasant proprietors are commencing to cultivate such crops as limes, coffee and cacao, it is being realized that good results can be obtained only where satisfactory protection is afforded.

In the absence of such protection the trees make poor growth and the yield of produce is unsatisfactory. In many districts the stunted and backward condition of the plants is at once an indication that the situation is unfavourable.

Again, in the case of such trees as those mentioned, where the yield depends upon the setting of the fruit, it is of primary importance that the flowers shall not be blown away by the wind before this takes place. That is one of the principal reasons for advocating the need of adequate protection for plantations of limes, coffee, or cacao. Neglect to take this precaution has been the cause of frequent failure.

Another advantage of wind-breaks—one that is of considerable importance in districts liable to more or less prolonged droughts—lies in the part played by wind-breaks in conserving soil moisture. By sheltering the land from the drying winds they exercise a strong protective effect on the

water supply, reducing evaporation to a considerable extent. This aspect of the question has already been dealt with in the *Agricultural News* (Vol. II, p. 338) in an article on the 'Conservation of Soil Moisture,' where it was mentioned that 'as the result of experiments, King states in his *Irrigation and Drainage* that "the drying effect of the wind at 300 feet was 30 per cent. greater than at 20 feet, and 7 per cent. greater than at 150 feet from the hedge."'

For these reasons we would urge a careful consideration of this matter when a plantation is being laid out. If new land is being opened up for the purpose, the object will be satisfactorily attained by leaving a strip of the natural forest. In other cases, suitable trees will have to be planted in rows and afterwards pruned and trimmed in order to make them effective wind-breaks. They must not be allowed to give too much shade, but should be trimmed to form hedges. Further, it is advisable to choose a tree that is evergreen: a tree which sheds its leaves in the dry season, that is, just at the time an effective wind-break is particularly required, is scarcely suitable.

Now, what are the most suitable trees for the purpose? We might give a long list of trees that have either been used or recommended for planting as wind-breaks, but we will refer to two only—Galba (*Calophyllum Calaba*), which is particularly suitable for planting in exposed situations; and, for more moist situations, *Inga laurina*, known in Dominica and the French Islands as Pois doux, in Antigua and Montserrat as Spanish oak, and in St. Kitt's-Nevis as Spanish ash.

Galba is a quick-growing tree, capable of standing the sea blast, and possesses the further important advantage of being an evergreen. It would be well if planters in those islands in which galba is found were to collect as many seeds as possible and have them sown. Similarly, the local officers of the Department might raise seedlings for distribution.

In the French West Indies hedges of *Inga laurina* are planted about every 200 feet, across the direction of the prevailing winds, throughout the cacao and coffee plantations. They are also planted by the peasants around their provision grounds. These practices might well be copied in the British West Indies. It will be necessary in the first place to urge upon the peasantry the need for such wind-breaks, and this will perhaps best be done by object-lessons at the Botanic Stations.

It will thus be seen that we strongly advise the systematic planting of wind-breaks as a protection from the wind. This is particularly necessary where crops like limes, coffee and cacao are being grown. One of the largest undertakings of this nature in the West Indies is in connexion with the Land Settlement Scheme in St. Vincent. On the estates that have been given out in allotments in that island a complete system of wind-break planting was determined: the total length of these lines amounts to 20 miles. Galba is the tree that has been employed in this case.

SUGAR INDUSTRY.

The Sugar Industry in the West Indies.

In his lecture to the members of the West India Committee on the 'Agricultural Industries of the West Indies,' Sir Daniel Morris made the following reference to the experiments with the sugar-cane and the present position of the sugar industry in these islands:—

It is an important feature in all the sugar-cane experiments carried on by the Imperial Department of Agriculture that the canes are cultivated in the same manner as the ordinary crop of the estate, so as to institute a close comparison on the most practical basis between these canes and those ordinarily grown on the estate. It may be mentioned that the expenses of cultivating sugar-canes at the experiment stations on estates are borne by the planters themselves. A very considerable number of new canes are raised every year. Only very few of these prove worthy of being cultivated on a large scale. Some of the new seedling canes have proved of great value, not only in the West Indies, but also in Louisiana, Cuba, Natal, Mauritius, and Queensland. The work of raising seedling canes is still, however, in the experimental stage, but it is full of promise in the future. The area planted in new seedling canes in British Guiana has steadily increased, and now comprises about 13,000 acres. In Barbados and Antigua, owing to the occurrence of disease in the Bourbon cane, seedling and other canes are almost exclusively cultivated. On regular plantations in the West Indies the total areas of seedling and other canes than Bourbon may be placed at about 30,000 acres. The yield of seedling canes has in many cases exceeded that of the Bourbon cane. On one large plantation in British Guiana the results in favour of seedling canes during the last three years have averaged 20 per cent.

Sir Daniel then referred to the excellent results that had attended the cultivation of West Indian seedling canes in Demerara, Louisiana, Cuba, and Queensland, information in regard to which will be found in the *Agricultural News*, Vol. III, pp. 179-80. Continuing, he said:—

A factor of great importance in regard to the future of the sugar industry is the removal of the Continental sugar bounties. Every one interested in the welfare of the West Indies fully appreciates the active part taken by our Chairman, and those associated with him, in obtaining the abolition of the sugar bounties. Already a much more hopeful feeling prevails in regard to sugar growing in the West Indies and the prospects are possibly more encouraging than they have been for many years. A prominent member

of the West India Committee has shown his confidence in the improved prospects of sugar growing by enlarging his possessions in British Guiana; the machinery on two of the largest estates in that colony have lately been improved; while at Antigua Sir Gerald Strickland has been successful in affording assistance in starting two sugar factories which will prove of great service in that island. There is also the hope that the Naudet system, which appears to combine the best results of crushing and maceration, may assist in reducing the cost of production. I understand that the new process is to be tried on a fairly large scale in Trinidad during the next crop.

There can be no doubt that in several of the West Indian Colonies the prospects for sugar growing are capable of being rendered as promising as anywhere in the tropics. There are extensive tracts of land in Jamaica, British Guiana, and Trinidad, where the soil is particularly well suited to the sugar-cane and where with good cultivation and a moderate quantity of manure the yield of sugar, now bounties are removed, would be likely to prove remunerative. The great point in favour of sugar cultivation, where it can be successfully carried on, is that it employs a very large amount of labour and gives employment also to various tradesmen, and circulates a considerable amount of money amongst the general community. There appears to be something specially favourable to sugar in the atmosphere of the West Indies and in the disposition of the negro population towards it. One of the difficulties that the Imperial Department of Agriculture meets with in its endeavour to promote minor industries is the strong predilection of the negro to plant nothing but the sugar-cane. In spite of getting the poorest results from the cultivation of the cane in the exhausted soil of their provision grounds, the negro still prefers to plant sugar-cane than to plant cotton. 'In the sugar-cane,' he says, 'I get something to eat; I cannot eat cotton, I therefore plant cane.' It may be that it is merely a matter of sentiment, but in any case, where sugar can be made to pay better than anything else, there is no reason why that cultivation should not be continued. What, however, is claimed is that by growing cotton in suitable localities, the people in the West Indies might obtain the same results in eight months from cotton as they obtain from sugar-cane in sixteen months.

Sugar-cane Cultivation in the Virgin Islands.

The following extracts relating to experiments with the sugar-cane in the Virgin Islands are taken from the *Report on the Experiment Station, Tortola, 1903-4.* It is stated that about 2,000 tops of seedling cane B. 147 were obtained from St. Kitt's and distributed among small proprietors:—

An acre of land on the bay side was cultivated and planted with sugar-canes in December and January. The variety selected was B. 147. About 15 tons of farmyard manure were dug in in December, and about 15 tons more in March; in the latter case holes were opened between the cane holes, and the manure placed in these and covered up. Owing to losses in shipment, due to the tops perishing, a large quantity died, and the vacant holes had to be supplied.

It was found that the tops grew much better than pieces of cane. Despite drought, the canes are now looking fairly well. The total cost up to date has been about £10. If the variety proves successful here, it is hoped to distribute it through the island. Hitherto the only cane grown in the island has been the old Bourbon, which is liable to attacks of fungus and borer.

It is felt that the island should at least produce enough sugar for local requirements. Last year some 20 tons of sugar were imported.

From the old 1-acre plot about 10 tons of cane were reaped and some fair-quality muscovado sugar was made. Muscovado sugar retails here at about 2*d.* to 2½*d.* per lb.

Forty-five barrels of sugar were made for tenants and occupiers of land in the vicinity of the station, the sugar being of a good grocery type, and worth about £1 5*s.* to £1 10*s.* per barrel locally.

A larger mill is needed. The present one does excellent crushing but is too small.

JOB'S TEARS AS A FAMINE FOOD.

The *Agricultural Ledger* (1904—No. 6) contains interesting information in regard to 'Certain Indian accessory vegetable food-stuffs used in greater quantity when famine presses.' Among the products studied were the seeds known as 'Job's tears' (*Coix Lachryma-Jobi*), which are fairly plentiful in the West Indies. The native name of this grain is *Kasaiya*. We publish the following extracts:—

Elliptical seeds, sharply pointed at one end, olive-green to brown in colour, extremely hard, so much so that they cannot be broken between the teeth. Their size is rather larger than ordinary barley. They contain a white kernel of great hardness and of no flavour.

Mr. Barucha (who sent the specimens) writes:—

'*Kasaiya* is a large seed collected from plants or shrubs that look like reeds and grow on banks of streams. The seed is enclosed in a hard shell which has to be broken with a rod or has to be roughly ground. If mixed with maize it can be turned into bread, but it is mostly cooked like rice. It tastes like wheat, and is considered nutritious. A pound and a half of this *Kasaiya* would suffice for a man per day, but it is generally not used alone, and is not resorted to as long as maize is to be had.'

RESULTS OF ANALYSIS.

Proteids	18·81 per cent.
Fat	6·2 ,,
Soluble carbohydrates ...	59·55 ,,
Fibre	1·28 ,,
Ash	3·4 ,,
Water	10·74 ,,
Energy value	378 calories.

Our analyses as well as those of Dr. Church show that this is a food specially rich in proteids and fats. When separated from its very hard husk, it should form a food of great value, especially as its energy-value is the highest of all the foods studied.

Professor Church writing of this food says: 'Throughout Assam and in the eastern frontier lands of India, this coarse cereal constitutes an important food of the hill tribes, replacing to some extent the millet of Northern and Southern India. . . The grains of wild kinds are exceedingly hard and are used as beads, those of the cultivated variety are much softer and more easily husked.'

He gives the following analyses of two varieties:—

Water	13·2	14·8	per cent.
Albuminoids ...	18·7	16·6	,, ,,
Starch	58·3	60·1	,, ,,
Oil	5·2	5·8	,, ,,
Fibre	1·5	0·9	,, ,,
Ash	2·1	1·8	,, ,,

INTERNATIONAL HORTICULTURAL EXHIBITION IN EDINBURGH.

The Council of the Royal Caledonian Horticultural Society has arranged to hold an International Horticultural Exhibition in Edinburgh in September 1905. The following letter has been addressed by the Secretary to Sir Daniel Morris:—

The Council of this Society has arranged to hold an International Horticultural Exhibition here in September 1905, and is desirous that the exhibits from the colonies should be as complete as possible. It is not at all necessary that the exhibits should be large, but rather that they should be representative of the products of the colonies represented.

I have heard from Kew that you are at present in this country and that you might probably see your way to make a really effective exhibit representative of the West Indies. If there is any further information which you would like to have, I shall be very glad to hear from you.

The enclosed Preliminary Prize Schedule was sent out containing the principal competitions arranged up to February in order to let exhibitors see generally what they might be expected to prepare for, and other competitions are at present under consideration.

Extract from Prize List.

CLASS VI.

To Growers only. Open to Canada, Australia, and any other British Colony.

Collection of fruits and vegetables of any sort.

First prize, £10 10*s.*; second, £7 7*s.*; third, £5 5*s.*

SHOW OF COLONIAL FRUIT IN LONDON.

A great show of colonial-grown fruit, and of British, colonial and foreign preserved and dried fruit, jams, etc., will be held in the Royal Horticultural Hall, Vincent Square, Westminster, S.W., on December 13 and 14, 1904.

The following extract from a letter, addressed to Sir Daniel Morris by the Secretary of the Royal Horticultural Society and extracts from the recently issued schedule will explain the objects and arrangements of this exhibition:—

I send you herewith a copy of the schedule recently issued for the Autumn and Winter Shows of this Society. You will see that the Society proposes to hold an exhibition on December 13 and 14 next, of colonial-grown fruits, both fresh and preserved, or dried or bottled.

This new departure has only been rendered possible for the first time this year, by the completion of the Society's new Centennial Hall in Vincent Square, Westminster, and the Council is anxious to make the exhibition a success, and that it should worthily represent our colonies.

Would you therefore be so kind as to let me know how best I may make it known in your colonies? I have sent the schedule to 100 colonial newspapers, in addition to the press at home, and if you would oblige us by sending the names of any prominent shippers, importers, or growers, who you think might be likely to exhibit, I should be glad to send them schedules direct, or I would send you any number for distribution.

If desired, the Society's own officials will unpack and stage exhibits, provided they arrive in good time; but the Society cannot undertake to repack and return. No charge is made for space. Opportunity will also be afforded for each colony to make a collective exhibit in addition to individual entries. Decorations of such exhibits should, as far as possible, be confined to plants and foliage representative of each colony.

An exhibition of jams and of dried, bottled, and otherwise preserved fruits will be held at the same time, which will be open to home, colonial, and foreign produce in separate classes. A press view will be held on Monday, December 12, from 5 to 8 p.m., and the exhibition will be open to the public from 10 a.m. to 10 p.m. on Tuesday and Wednesday, December 13 and 14. The goods must be cleared away on Thursday, December 15.

Extract from Schedule.

DIVISION I.

Colonial-grown Fruit.

The staging must be finished by 4 p.m. on December 12, as there will be a press private view at 5 p.m.

The colony in which the fruit has been grown must in all cases be stated. Medals or other prizes will be awarded at the discretion of the Council.

Class 1.—Collection of colonial-grown Fruit. Such things as yams and sweet potatos may be included.
Class 2.—Collection of colonial-grown Apples (Eating).
Class 3.—Collection of colonial-grown Apples (Cooking).
Class 4.—Collection of colonial-grown Pears.
Class 5.—Colonial-grown Pine-apples.
Class 6.—Colonial-grown Bananas.
Class 7.—Colonial-grown Mangos.
Class 8.—Colonial-grown Grapes.
Class 9.—Any other colonial-grown Fruits.
Class 10.—Colonial-grown Yams, Sweet potatos, etc.

COTTON NOTES.

The Cotton Industry in the West Indies.

Considerable interest is being taken in England in the efforts that are being made to establish a cotton industry in these islands. We reproduce the following interesting article from the *Times* of July 21:—

It is satisfactory to report that the experimental cultivation of cotton in the West Indies has proved a success, and that the industry is now established on a commercial basis. Plantations exist in Barbados, St. Lucia, St. Vincent, Montserrat, Antigua, St. Kitt's, Trinidad, and the smaller islands, while plots have also been started in Jamaica and British Guiana. The total area estimated to be under cultivation is 4,000 acres. During the season just ended Barbados alone shipped, up to March 31, 244 bales and 2 bags of cotton, weighing 61,000 lb., and the gins have been busy since. The Imperial Department of Agriculture, which has the work in hand, has orders from planters for Sea Island seed sufficient to plant 7,000 acres,* and as this quantity has been paid for, the presumption is that it will be used. In Jamaica, where the pioneer work is being carried out by the Board of Agriculture, enough seed has been disposed of to plant 500 acres. A number of Syrians, who are acquainted with cotton growing in Egypt, are engaged in the cultivation there. Central factories for ginning and pressing the cotton have been erected in the various islands, and a cotton gin expert, from the Sea Islands, has just completed four months' work on the machines, all of which are now in perfect working order. He states that the factory in St. Vincent is the best-arranged and best-equipped he has ever seen. A nine-hours' run of the six gins yielded 3,800 lb. of lint; in Barbados, where the methods and appliances are not so scientifically complete, a similar run gave from 1,500 lb. to 1,600 lb. There are a few private ginneries, but the majority are Government undertakings carried on under the direction of the Imperial Department of Agriculture. The cotton is ginned, baled, and shipped for the planters for 3c. per lb. of lint; seed-cotton is also purchased at the rate of 4c. per lb., which is equivalent to payment at the rate of about 11*d.* per lb. for the lint in the Liverpool market. The prices obtained for the Sea Island cotton have been highly satisfactory. One recent consignment from Barbados was valued at from 16*d.* to 17*d.* per lb., another averaged just under 15*d.*, the highest price being 16½*d.*, and the lowest 13*d.* Prices current exhibited in Barbados at the same time showed that Sea Island cotton was being quoted in Savannah at from 10*d.* to 12½*d.*, but this was evidently the price for common lint, as the last crop on the Sea Islands brought from 30c. to 35c.—this, of course, representing the result of thirty odd years of careful selection and cultivation. The figures given are sufficient to indicate that West Indian cotton, grown from Sea Island seed, is capable of yielding a return quite equal to the finest product of America. It is calculated that, the yield of lint being assumed to be 204 lb. per acre—the average in America—and the total cost of placing it in the Liverpool market 7*d.* per lb. for cotton fetching 12*d.* per lb., the net profit would be at the rate of £5 2*s.* per acre. † Labour is cheaper in the West Indies than in the Southern States; the cotton gin expert referred to was amazed at the low value of the labour in Barbados.

Sir Daniel Morris, the head of the Imperial Department of Agriculture, is of opinion that the only cotton that should be grown in the West Indies is the Sea Island variety, which, it is well known, is a native of these islands. Other varieties are therefore being eliminated. Some planters favour the Upland, and even the indigenous varieties which are still found growing wild, but it will undoubtedly prove more advantageous to devote attention only to the highly cultivated, long-staple Sea Island cotton. The area throughout the world suitable for the growth of Upland is unlimited; that able to produce Sea Island is strictly limited. The latter fetches double the price of any other cotton, and, like Blue Mountain coffee, will remain unaffected by future fluctuations of the market. A sample of the native cotton of Jamaica has been sent to England and pronounced very fine, being valued at 14*d.* per lb. It is a cotton which appears to resist insect pests, and many think that a first-class variety might be evolved from it. The experiments in the island, however, are being made with Sea Island seed, and it will probably be found wiser to begin where the Sea Island planters have left off than to engage in experiments which may not prove successful.

Many difficulties have naturally been encountered in establishing the industry, owing largely to the inexperience and ignorance of the growers, the most formidable being the attack of the cotton worm. Remedies were not at hand, and loss was sustained; but the planters are now forearmed, and they believe themselves able to cope with any similar emergency. Every assistance is rendered to growers by the Imperial Agricultural Department, which has published and circulated an extensive literature on the subject. One of Sir Daniel Morris' latest ideas is to send the officers of the Department to the various islands to deliver popular lectures on the industry with magic-lantern illustrations. He recommends, however, that only capable planters should go in for cotton growing at present, and advises those who wish to come out to the West Indies to embark on planting on a large scale, to pay a visit first to St. Vincent, and study the conditions and opportunities there. Great credit is due to him for his indefatigable efforts to promote the industry during the past four years. West Indian planters are not very ready to strike out on new lines, and, but for the steady persistence and influence of the Department, aided by practical assistance from the British Cotton Growing Association and the West India Committee, it is doubtful whether the present important results would have been achieved.

The following paragraph appeared in the *St. James' Budget* of July 23:—

The announcement that no less than 4,000 acres are now under cultivation seems to point to the establishment of the cotton industry in the West Indies upon that commercial basis which must be the foundation of its success. Plantations are now dotted over practically every one of the islands, and the future output shows a most promising tendency to increase. For the coming season the Imperial Department of Agriculture has already received orders—and better still, payment, for this argues confidence on the part of the planters—for enough seed to cover 7,000 acres. All this, considering the difficulties which have been encountered during the experimental period, forms a most encouraging start. And the excellent educational work which has been carried on, under the guidance of Sir Daniel Morris, by the Agricultural Department, must be most heartily commended for the stimulus and direction which have been given to the efforts of the pioneers in this most important movement.

* Probably 10,000 acres will be planted during the season 1904-5.

† Including the value of the seed for feeding purposes, the total net profit would be about £7 per acre.

RABBIT KEEPING IN THE WEST INDIES.

The following is a further instalment of Mr. Barclay's notes on rabbit keeping. The subject of this instalment is the feeding and watering of rabbits:—

FEEDING.

The young rabbits will begin nibbling at green stuff at three weeks old, although they may not be seen at first, as they come out during the night. They should get as much of this as they can eat and they will soon also eat every plant, root or grain put in. Rabbits should not be fed invariably the same stuff or roots, but should have a variety—not necessarily two or three different things at the same meal, but preferably a round of several plants they like for successive feeds. The following are all eaten with relish:—sweet potato vines, cowitch vines, pea vines, thistle (called in Jamaica 'Rabbit Feeding,' and eaten by rabbits with avidity); Spanish needle (a good laxative when young), all grasses eaten by cattle—but the rabbits only take these generally when none of the foregoing are available—Guinea grass, Para grass, Bahama grass, pimento grass, rice, corn (maize) and Guinea corn stalks and leaves are all liked when green, and so are the young blades of the sugar-cane. The leaves of the bastard cedar trees, wild grape, yam leaves, turnip, carrot, beet (both leaves and roots), cabbage, lettuce, parsley, etc. For roots, sweet potatos are most convenient and may be given raw, or boiled; also yam boiled, sweet cassava boiled. Bananas just turning yellow are relished. For grains, oats are best, but as it is not a native product, I find rice, cracked corn, a few peas and Guinea corn all liked. A little parched corn, and especially crusts of bread are best of all for the doe in young. I have mentioned that soaked peas are excellent for the suckling doe.

It should be noted that sweet potato slips should never be given to a doe about to have young or when suckling young. It is current, in Jamaica at any rate, that it dries up the milk; and there may be truth in this. There is generally some foundation for such ideas, although we are apt to say 'Bosh!'

We have in the West Indies a great variety of foods available, and few owners would require to buy any feeding. For the young, growing animals, a variety of such green stuff, as has been mentioned, is good (giving just enough that they clear it off), and it should be given every evening at sundown. Note that wet stuff must *not* be fed, and if rains are prevalent the green stuff should be pulled the day before and put aside under cover to dry. *No wet, green stuff should ever be given.*

It is judicious to have in the hutches or boxes a rack to hold the feeding, otherwise when flung on the floor, half of it is wasted. A root of sweet potato, a chunk of hard-boiled yam or a crust of bread should accompany the green stuff, placed at the bottom of the heap so that they will not eat it first. If in the morning there is some green stuff repeatedly left uneaten, reduce the feed by the same quantity next evening, trying a little more occasionally to test their appetites. At the morning feed a little porridge and milk, made of rolled oats or cornmeal, is best, if this can be afforded, say about a heaped table-spoonful for each young rabbit, increasing to two for a full-grown animal. If not this, about the same quantity of oats, corn (maize) or Guinea corn, a banana, a crust of bread, and a little more green food, will do. The mother doe, as has been stated, should also have a few soaked peas.

WATER.

If any grain or dry meal stuff like cornmeal or rolled oats or oatmeal is fed, then water must be put before the rabbits; and the doe-mother, when about to have young, or after she has had them and is suckling them, should *always* have water by her. The water should be renewed each morning. Though rabbits, like sheep, in other countries seldom drink, here where the days are hot, and especially where the air is dry, rabbits will drink regularly.

AGRICULTURE IN PORTUGUESE EAST AFRICA.

The following account of the local industries in Portuguese East Africa is taken from the *Consular Report* on the trade of Beira for 1903:—

The exported produce of the district is almost a negligible quantity. At present, sugar, rubber, and wax form the most important articles enumerated. The former, manufactured on the Zambesi, is shipped exclusively to Lisbon, where it receives important preferential treatment and a substantial bounty per ton; but large plantations of cocoa-nut palms are being made at various points on the coast, with a view to establishing a future export trade in copra, and doubtless when the young plants come into bearing the result will amply fulfil expectations. Ground nuts, although very largely and profitably exported from Quilimane and the northern ports of the province, would seem to attract but little attention here, and the same may be said of other important industries which are capable of being established.

Much progress has been made during 1903 by the government of the Mozambique Company in an interesting experimental garden or plantation which it has established at Govuro in the south of the territory, with a view to determining what plants, etc., are best adapted to cultivation in the conditions locally obtaining.

In addition to what has been done at Govuro, most valuable and interesting experiments have been made in the cultivation of cotton, for which this district is believed to be admirably adapted, and which should prove a source of great profit to local planters. The experiments in question were made under the direction of the company's officials, and have had encouraging results. An area of about 4 acres was planted, but, owing to a misunderstanding, only 1,500 plants were raised instead of 5,000, which that extent of land could easily have sustained. The result returned some 1,300 lb. of cotton, which was forwarded unginned to Europe for examination and report. The British, French, and Belgian experts who conducted the examination were unanimous in regarding it as a fine cotton of the ordinary long-staple description, but remarkable for its extraordinary strength. The value placed upon it properly ginned and picked was 7½*d.* to 8*d.* per lb. Naturally, 1,300 lb. of cotton to 4 acres of land is not a paying proposition; but the area mentioned, as will be gleaned from the above figures, is capable of producing more than three times that quantity. Experiments with this valuable commodity are now being made on a much larger scale, and it is believed that cotton cultivation has a great future before it in this large and apparently suitable region.

SCIENCE NOTES.

The Argan Tree of Morocco.

It is said that the most interesting vegetable production of Morocco is the Argan tree (*Argania Sideroxylon*). This tree, which belongs to the natural order *Sapotaceae*, does not grow to a great height, but its trunk is of considerable size, one tree having measured 26 feet in circumference. The tree has a peculiar habit of growth; it gives off branches at a height of some 3 feet from the ground, which at first descend till they touch the ground; at a considerable distance from the trunk they ascend. In this way each tree occupies a great space, the individual referred to above having a circumference of no less than 220 feet.

From the seeds a valuable oil, resembling olive oil is extracted; this is used for cooking purposes and also as an illuminant. Moreover, the fruits of the argan tree are eaten by stock.

A full and interesting account of this tree is given in Hooker's *Marocco and the great Atlas*, where it is stated: 'When the fruit ripens, herds of goats, sheep, and cows are driven thither; a man beats the tree with a long pole, and the fruits fall and are devoured voraciously by the cattle. In the evening they are led home, and, when comfortably settled in their yards, they commence chewing the cud and throw out the nuts, which are collected each morning as soon as the animals have departed upon their daily excursion.'

We are indebted to Mr. Henry Harries, of Kew, London, for the following memorandum on argan nuts, prepared by His Majesty's Vice-Consul at Mogador:—

'The natives collect the ripe nuts by knocking them off the trees with a stick; they then break the nut with a stone to get the kernel out: they half-roast these and grind them in a hand-stone mill till the oil comes out.

'The residue is made into cakes to feed camels, cows, and goats—not horses—and it is called "zigmoona." Sheep also eat it.

'Europeans like the oil for culinary purposes. They heat the oil, which is brought in by natives in bottles. A piece of bread is put in the oil and is cooked with it; this removes the strong flavour. Natives, however, do not object to this strong flavour. It is preferred to olive oil for cooking purposes; it is sweeter and more expensive by reason that each nut has to be cracked by hand, and these are very hard. The oil is burned by the natives for lighting purposes, but is of no use as a lubricant, as it gets hot directly.'

Seeds of the argan tree were forwarded to the Imperial Department of Agriculture by Mr. Harries in January last.

This is a sub-tropical, rather than a tropical, tree, but might be suited for planting in dry, *hilly* districts in the West Indies.

Fixation of Atmospheric Nitrogen.

In the *Agricultural News*, Vol. II, p. 406, we published a note on the subject of the fixation of atmospheric nitrogen by chemical agency, in which it was stated that Dr. Frank had demonstrated that this could be effected by means of the carbides of barium and calcium. The latter, it was mentioned, was converted into calcium cyanamide, which could be used as a direct means of enriching the soil.

The following extracts upon this subject, taken from the *Bulletin of the Imperial Institute*, are of considerable interest from both the scientific and the practical point of view:—

The use of artificial nitrogenous manures supplies ready means of improving soils deficient in nitrogen, and the substances mostly used for this purpose at the present time are ammonium sulphate and sodium nitrate. Nitrogenous manures have so far been more expensive than those containing other plant constituents, and for this reason the importance of devising a practical means for utilizing the nitrogen of the atmosphere as a source of such manures has long been recognized. It is therefore interesting to note that the substance calcium cyanamide has recently been prepared with the use of atmospheric nitrogen on a commercial scale in Germany, and has been placed on the market under the name of 'Kalkstickstoff.'

The manurial properties of this substance have been tested by Professors Wagner and Gerlach, at Darmstadt and Posen respectively, with various crop-plants, and although there is much to learn with regard to the conditions under which it may be most advantageously employed, this material has already proved itself a manurial agent apparently as valuable as ammonium salts and nearly as effective as sodium nitrate. It is considered very probable that if calcium cyanamide can be manufactured cheaply, it will find a place among the artificial nitrogenous manures.

SEA-WEED AS A MANURE.

The following note on the use of sea-weed in Cyprus is taken from the *Cyprus Journal* for June:—

On many parts of the sea-coast of the island the wild waves of winter cast up from the sea large quantities of sea-weed, which is sometimes used by peasants, when the supply of old chopped straw is short, in the preparation of their sun-burnt mud bricks. This sea-weed, however, if the salt it contains is washed away by one or two good rains, can be used very profitably for manuring fields and plantations situated not far from the shore. For this purpose the sea-weed is conveyed to a more or less elevated position, where a bed of it from 4 to 5 feet thick is formed; and after one or two sharp showers it is used as a manure either alone or, better still, mixed with stable manure. Sea-weed becomes far more useful as manure, if, before being brought to the field, it is used as a litter in the stable, because by absorbing the liquid excrement of the cattle its fertilizing value is increased.

CACAO CROP OF BRAZIL.

The following note appeared in the United States *Monthly Consular Reports* for March 1904:—

The cacao season of 1903 is much later than that of 1902. Cacao is a very erratic crop, and the oldest inhabitant will not venture a prediction on it. The last of the crop of the previous year was practically all in the manufacturers' possession by this time. This year it is still coming in abundantly and will probably run far into September. The cacao season includes two crops, beginning, respectively, in January and June. The summer crop is said to be a shade better (because drier) than the winter crop, though the yield should be about equal. This year more cacao came in the market in July than was received during the entire six months preceding. A few days ago about 2,000 tons were stored in Para and every steamer was taking away large cargoes of it. However, the demand continues strong and the price good.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 271 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, AUGUST 27, 1904. No. 62.

NOTES AND COMMENTS.

Contents of Present Issue.

We desire to draw attention to the necessity for planting wind-breaks for the protection of crops. This subject is fully dealt with in our editorial.

On pp. 274-5 we reproduce in full Sir Daniel Morris' statement of the position of the sugar industry in the West Indies. Special reference is made to the Department's efforts in behalf of the industry.

Preparations are being made for holding two important Horticultural Shows in the United Kingdom. It is important that the West Indies should be well represented at these, and the matter should receive early attention. Full particulars are given in the extracts published on p. 276.

The *Times'* review of the West Indian cotton industry, published on p. 277, will be read with interest by planters.

The feeding and watering of rabbits form the subject of Mr. Barclay's notes on rabbit keeping in this issue. See p. 278.

Under the heading 'Insect Notes' will be found an interesting report on insects prevalent in St. Kitt's-Nevis, and a note on the control of the Brown Ant in Porto Rico.

On p. 283 is an illustrated article describing the methods of budding the mango. The directions are clearly stated and should easily be carried out.

We publish a report from Mr. Russell Murray on West Indian produce in Canada. This report was unfortunately crowded out from our last issue.

Teneriffe Onion Seed for the West Indies.

The onion seed ordered from Teneriffe by the Imperial Department of Agriculture was forwarded to the various islands by the last Royal Mail steamer.

In all 767 lb. have been received; this is made up of 526½ lb. of white and 240½ lb. red seed.

Of the total quantity 297 lb. are for Barbados, 254 lb. for Antigua, 50 lb. each for Jamaica, St. Kitt's, and Nevis, and smaller quantities for the other islands.

This seed has been specially selected for the Department and is the best seed obtainable. It is hoped that it will give good results.

We would again urge those who are proposing to grow onions to sow the seed in beds, transplanting the seedlings when large enough to the fields.

Department Publications.

In consequence of the exceptionally large demand for Pamphlet No. 31, *A. B. C. of Cotton Planting*, it has been found necessary to issue a second edition. This pamphlet can therefore still be obtained of all agents of the Department; price 4*d.*, post free 5*d.*

The hearty reception that has been accorded to this little publication is a gratifying indication that cotton cultivation is being taken up by the peasant proprietors as well as the planters throughout the West Indies.

Two more of the annual reports on the Botanic Stations, etc., are issued to-day. These are (1) *Reports on the Botanic Station, Agricultural School, and Land Settlement Scheme, St. Vincent*; and (2) *Report on the Experiment Station, Tortola.* The price of these publications, which are reviewed on p. 285, is 3*d.* each.

Dominica Pine-apples in London.

In reference to the note in the *Agricultural News*, Vol. III, p. 248, relative to the sale of Dominica pine-apples in London, it might be mentioned that a further shipment has been received by Messrs. Geo. Monro, Ltd., Covent Garden Market, who report that the fruits, which came in quite green, were placed in the banana room and coloured up all right and have been partly sold. The shipment consisted of twenty-eight fruits, which sold for £5 6*s.* 6*d.*, or at an average price of 3*s.* 9½*d.* each. The results of the sales are most promising. It must be borne in mind that the consignment arrived at the height of the London season and was not too large to meet the demand.

The brokers write that in selecting pine-apples it is better for shippers to err on the green side than the ripe, especially at this time of the year. They desire it to be impressed upon shippers that careful packing is most necessary. Many pine-apples have been received from the West Indies which have had to be sold at about a quarter of the price at which they should have been sold, on account of the difference in their condition on arrival.

The fruits, the sale of which is recorded above, were Smooth Cayennes grown and packed at the Botanic Station, Dominica.

Rubber Exports from Mozambique.

The *Consular Report* on the trade of Mozambique, referring to the great increase in the amount and value of the exports, states that the chief cause of this lies in the largely augmented output of rubber, the total value of which, in 1903, was £35,296, as against £12,058 in the previous year.

It is stated that the rubber is of inferior quality, being extracted by what is known as the 'cooking' process. There are three recognized grades of rubber, viz., (*a*) pure rubber extracted by incision, (*b*) impure rubber extracted by incision, and (*c*) rubber extracted by 'cooking and crushing.'

Only 100 kilos, of the value of £20, of the first grade were exported. The exports of impure rubber extracted by incision amounted to 70,452 kilos, valued at £2,348, the remaining 278,878 kilos being 'cooked' rubber. In all three grades there was an increased export.

The other exports from Mozambique are ground nuts and mealies. The exports of the former, which were shipped to Bombay, Germany, and France, were of the value of £6,055 during the year 1903.

A New Cacao Disease.

Specimens of twigs and leaves of cacao have recently been received at the Head Office of the Imperial Department of Agriculture from St. Lucia for examination. It was found that they were attacked by a fungoid disease which appears to be new, at least in the West Indies.

The external appearance of the twigs attacked is quite characteristic. The hyphae of the fungus are joined together into dark-coloured threads, about the thickness of a horse-hair. Sometimes a number of these threads hang quite loosely about the cacao twigs, and then resemble very closely a bunch of horse-hair; closer examination reveals that these threads are all part of one branching system and that some of them are growing closely adpressed to the bark. In other cases the threads are nearly all growing in this latter manner, viz., attached to the bark. The threads also spread to the leaves and then appear to follow the veins. In their youngest parts the threads are white and thinner.

It is proposed to make a further study of this disease. So far, it is known in only one small area in St. Lucia, and only on cacao. Should any of our readers have any knowledge of it, it is to be hoped that they will communicate any information to the Imperial Commissioner of Agriculture. The points on which information is desired are whether the disease occurs in any of the other islands, whether it occurs on cacao or on any wild trees or bushes, how much damage it does, and whether any measures have been taken to eradicate it. Dried specimens of affected twigs and leaves should, if possible, be forwarded at the same time.

Similar diseases have occurred on tea in India and Ceylon. It has been found possible to deal with them by careful pruning and by painting the affected parts with a lime-sulphur wash.

Agriculture in the Gold Coast.

We have received the *Report of the Botanical and Agricultural Department of the Gold Coast* for 1903. The report deals with the gardens at Aburi, the station at Tarkwa, the Christansborg Castle garden and the cocoa-nut, rubber, and kola plantations.

In an appendix the Curator makes interesting observations on some of the most important vegetable products exported from the colony. Although the exports of cacao steadily increased up to 1902, there was a decline in 1903. It is stated that the cultivation of this crop is rapidly spreading in all directions. The quality of the product appears to have deteriorated, in consequence of bad curing and insufficient grading.

The exports of timber were larger than during the previous year. Rubber was exported in increased quantities, the increase in value over the exports of 1902 being £107,898. The exports of coffee, kola, and copra also show an increase. It is reported, however, that there was a decline in the exports of palm kernels, palm oil, Guinea grains, and gum copal.

Considerable attention has been paid to the encouragement of the cotton-growing industry; the natives are beginning to take an interest in this crop, although, under existing conditions, it does not appear that there is much profit in the industry. The price paid for unginned cotton is 1½*d.* per lb., while the cost of transporting a load of 60 lb. of cotton to the nearest market varies between 1*s.* 6*d.* and 4*s.*

The Application of Paris Green to Cotton.

The *Bulletin of the Department of Agriculture*, Jamaica, for July, contains a letter from Mr. W. B. Seabrook relative to the method of applying Paris green to cotton. In this letter Mr. Seabrook advocates the use of the undiluted poison, and it is stated that the planters in the Sea Islands have given up mixing the Paris green with lime.

As Mr. Seabrook's advice might, at first sight, appear to be somewhat contradictory to that given by this Department, we reproduce the following extract from the *West Indian Bulletin* (Vol. IV, pp. 328-9), in which the reasons for recommending the admixture of lime for the West Indies are clearly stated:—

> The lime has been recommended in mixture with Paris green, in these islands, principally that the labourer might be able to see what he has done as he goes along, and the overseer could also see that the work has been done thoroughly, since Paris green by itself would not be seen on the leaves. Moreover, the lime serves to prevent undue waste. The labourers in the cotton fields in the United States are accustomed to cotton as a principal crop, and realize that their living depends on the success of the crop; but in the West Indies this is different. The labourers having been brought up in the cane fields are not able to take the interest in cotton that they should, and their work is not reliable unless some check is kept upon them, so that it can easily be seen whether they have done their work properly. When the labourers become interested in the success of the cotton crop, and realize its importance to them, as well as to the planter, then it will be possible to use Paris green as it is used in other places, and get the same efficiency in results.

INSECT NOTES.

St. Kitt's-Nevis.

The following extracts, taken from Mr. Ballou's report on his recent visit to St. Kitt's-Nevis, contain interesting references to insect pests which were found to be prevalent in the presidency :—

ST. KITT'S.

The Botanic Station, from its location and the nature of its soil, suffered severely from the lack of rain. The dry weather was especially favourable to the development of scale insects. The return of favourable growing weather, the completion of the plans for planting new trees and shrubs, and the removal of a few useless specimens, together with the application of insecticide remedies which I suggested to Mr. Shepherd, will, I believe, make this station even more attractive than usual, with a minimum of insect pests.

Many of the scales ordinarily to be found in these islands were seen on the plants at the Botanic Station, most of them in comparatively small numbers; a few, however, were found in some quantities. Among the latter may be mentioned the purple scale (*Mytilaspis citricola*) on orange, the guava mealy scale (*Pulvinaria ficus*), the common shield scale (*Lecanium hesperidum*) on star apple, and the smaller snow scale (*Chionaspis minor*) on hibiscus.

On the Hibiscus and Imbricaria hedges where the small snow scale was abundant a small, black lady-bird was found in large numbers. This insect was actively feeding on the scale and is probably very valuable in helping to keep down this particular scale. The lady-bird has not been determined, but it is closely related to the *Pentillia* which has been so useful in the United States as an enemy of the San José scale. It may be possible to introduce this lady-bird to other islands to assist in keeping down certain species of scale insects.

Cotton during the past year was seriously injured by the ravages of the cotton worm (*Aletia argillacea*). The damage done was very severe because of the scarcity of Paris green at the time it was most needed.

The leaf-blister mite (*Eriophyes gossypii*) has been present and occasioned some loss in the cotton crop, but has not been so serious as in Montserrat, where it first came to notice. Occurring as it did simultaneously with the severe attacks of cotton worm, it caused more serious damage than it otherwise would have done.

At Conaree estate an interesting experiment in growing cotton among plant canes was noticed. An account of this experiment was given in the *Agricultural News* (Vol. III, p. 213). At the time of my visit (July 8) this cotton was very vigorous in appearance with many bolls and flowers, and apparently very little diseased. The leaf-blister mite was present, but on only a small proportion of the plants. It is of interest that these plants had been growing about seven months before the leaf-blister mite was noticed, although careful watch had been kept for it, and in July only a few of the bottom branches showed the effects of its presence. It may also be mentioned that this cotton had not been attacked by the cotton worm.

NEVIS.

During the past year the cotton worm had been a serious pest; the cotton stainer had appeared in some parts of the island, and the leaf-blister mite had also done some damage, but it did not occur in all parts of the island.

At Maddens estate I visited a plantation of cacao in one of the valleys on the mountain side. The plants were strong and vigorous in appearance and were, for the most part, free from disease and pests. A few plants, however, had been attacked and the leaves more or less damaged. No pest could be found at work and the injury was assigned to a small snail which is very common at that place. Lime and Paris green and lime were recommeded for trial as remedies. The plants seemed to be attacked only in the vicinity of the footpaths.

The Brown Ant in Porto Rico.

The Brown Ant (*Solenopsis geminata*) is a serious pest in the orange groves of Porto Rico; and the Porto Rico Agricultural Experiment Station has recently issued a special *Circular* (No. 4), entitled 'Control of the Brown Ant in Orange Orchards,' of which the following is a brief summary:—

These ants feed on small seeds, dead insects, and the honey wax of the scale insects. They make their burrows at the foot of the trees and apparently do no damage until they have acquired a taste for the gum of the tree. From that time on, they seem to prefer the tree gum to the secretion of the scale insects, and to obtain it they not only make wounds, but keep old wounds open by gnawing at the edges, so that they are not able to heal over. In this way trees are sometimes entirely girdled and killed. This pest is considered to be next in seriousness to the scale insects, and already severe damage has been done to the citrus orchards in Porto Rico. A large number of remedies have been tried, and two of the best are recommended.

Girdle Paint.—This is a sticky, waxy mixture for covering wounds, to keep out air and water and prevent rotting of the wood, and to stop the passage of the ants up the trees. It is made as follows: 4 parts of common rosin and 3 parts (by weight) of raw linseed oil are melted together over a slow fire and boiled for ten minutes. After removal from the fire, but while still hot, this liquid is beaten up with a small quantity of cold tobacco tea (about ½ pint of the tea to 3 pints of the rosin-oil mixture). The addition of the tobacco tea will thicken the brown liquid to a yellowish, semi-solid wax, which should retain its extreme stickiness for two to four days when applied to the trees.

A ring of this wax, about 2 inches wide, around the trunk just above the ground, and a second ring about 6 inches above the first will prevent the passage of the ants, so long as the wax retains its sticky properties.

It is very valuable also for covering wounds of all kinds whether made by insects, gnawing animals, or by pruning.

Ant Killer.—For exterminating ants in their nests. This is made of rosin, 2 parts; washing soda, 1 part; tobacco tea, 1 part. Boil all together over a slow fire, stirring slowly, till all the rosin is dissolved. After simmering about fifteen minutes, remove from the fire and add, little by little, 10 to 15 parts more of tobacco tea, stirring rapidly for five minutes or more. A few spoonfuls of this mixture, applied with a coarse syringe at the top of an ant nest, will kill the ants without injuring the tree roots. It must be mixed to just the right consistency, however, for if too thick it will not run, and if too thin will soak into the ground and will not follow the galleries of the ant nest.

BUDDING THE MANGO.

The following notes have been extracted from *Bulletin* No. 46 of the Bureau of Plant Industry, U. S. Department of Agriculture, 'The propagation of tropical fruit trees and other plants':—

APPLYING THE BUDS.

Two-or three-year-old seedlings and moderate-sized trees may be used as stocks on which to bud approved varieties of the mango. The stems selected for the reception of the buds should be at least an inch in thickness. When of this diameter, both wood and bark are thoroughly ripe, and the union of the scion with the stock will be easily accomplished if the operation of inserting the buds is performed carefully. The method of budding which has been found to work most satisfactorily (fig. 10) consists in removing a rectangular piece of bark from the stock and inserting a piece similar in shape and a trifle larger in size, having a bud in the centre, from a branch of a desirable variety.

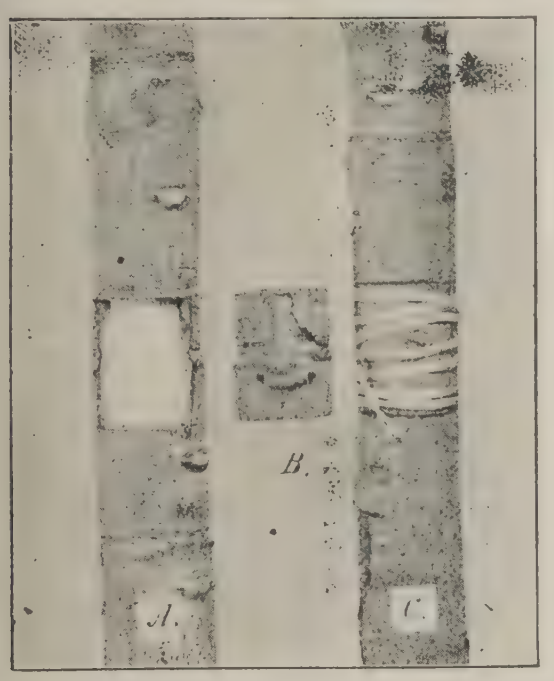


Fig. 10. RECTANGULAR PATCH METHOD OF BUDDING THE MANGO.

The bud must be selected from wood old enough to have lost its foliage. This means that the bud wood will sometimes be over two years old. To a certain extent success depends upon the precision with which the section of bark is removed from the stock and also from the variety to be propagated, as the more neatly the bud section is fitted into the space prepared for it, the greater the probability of a successful union.

After the section of bark from the bud stick is nicely fitted in place, and before tying, a small quantity of grafting wax should be smeared over the parts where they come together and tied firmly in place with thick strands of raffia. (Fig. 10, c.) This effectually prevents the admission of air to the spaces which, no matter how carefully the operation be performed, exist between stock and scion; it also serves to prevent moisture from gaining access to the cut surfaces. The cut surfaces and all but the bud should then be covered with strips of cloth dipped in melted paraffin, wrapping being begun at the lower part, so that when finished, water will not gain entrance to the wrapped section of bark. If that part of the stock where the bud is tied be exposed to the sun, it is always advisable to furnish shade, which is best supplied by strips of paper tied above the bud and extending down over it. Two weeks may be allowed to pass before an examination is made. The cloth wrappings may then be removed, and the raffia should be loosened if there is danger of its cutting into the bark. When a sufficient time has elapsed to make certain that union has taken place, part of the top of the stock should be removed in order to encourage the bud to start.

WHEN TO BUD.

Budding may be performed at any time during the growing season, but with each plant there are certain periods when the operation will be found to be more successful than at other times. These periods are indicated by the growths or 'flushes' being about half developed. At these times the sap appears to be more active than at others, as the bark peels from the wood more readily than when the growths are of firmer texture.

A SECOND METHOD OF ATTACHING THE BUD.

Another method of attaching the bud, varying slightly in the details from that given above, has been practised during the past season at Miami, Florida, with an encouraging degree of success. (Fig. 11.) The bud section differs from the rectangular-shaped piece of bark in that one end of it is pointed instead of being cut straight across, which makes it possible to push the bark of the scion down tight against the bark of the stock; the top part is then cut off square with the transverse cut in the bark of the stock, and is pressed firmly into position previous to tying and waxing in the usual way.

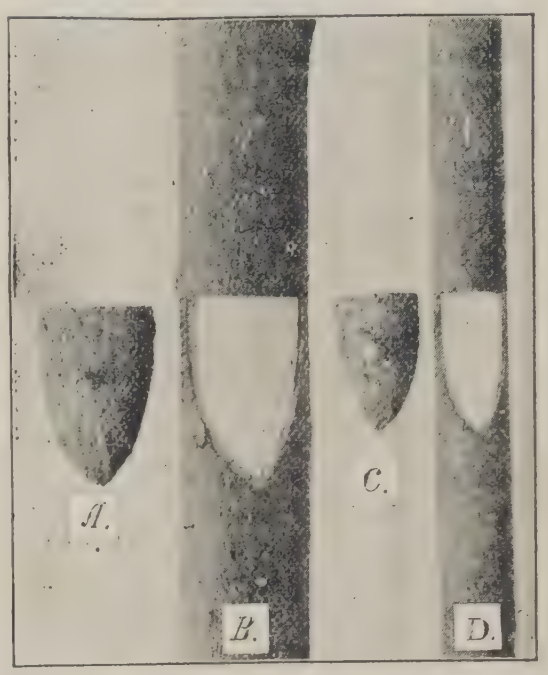


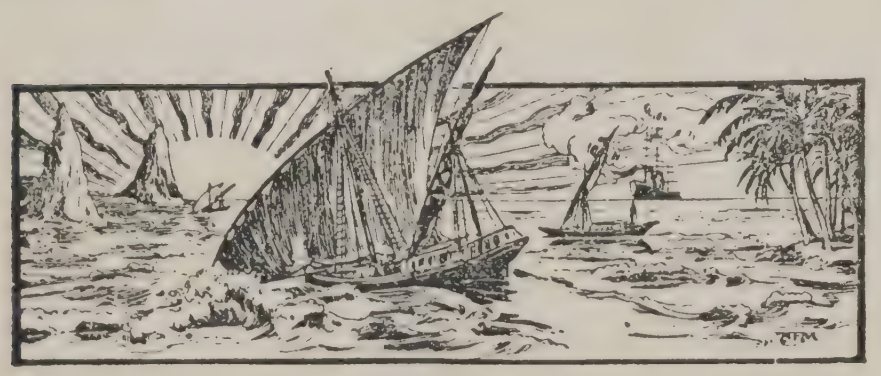
Fig. 11. METHOD OF BUDDING THE MANGO USED IN FLORIDA.

EEL-WORMS IN ST. VINCENT.

Specimens of yam plants were received at the Head Office of the Imperial Department of Agriculture, Barbados, recently from one of the refugee allotments at St. Vincent. The allottee complained that his cacao, yam, cassava, and tannia plants would not grow. On examination it was seen that the underground parts of the yams showed a number of large swellings or galls. These galls were examined microscopically and were found to contain a number of minute, thread-like eel-worms, which were undoubtedly the cause of the trouble.

These eel-worms are a common pest in cultivated land throughout the world, and are very difficult to deal with. They attack very many kinds of cultivated plants and weeds, both in the field and garden. Attacked plants are usually stunted in their development; then, sooner or later, the foliage withers and the plant dies.

A thorough dressing of lime is one treatment recommended; 1 to 2 tons per acre should be applied in two or three lots during the year. Carbon bisulphide kills the worms when applied to the soil, but is too expensive except in gardens. Another way is to find out what plants are not attacked by the worms and then to plant only these for a number of years, until the pests are starved out; the difficulty of this method lies in the necessity for keeping the land free from weeds during the period of starvation.



GLEANINGS.

Efforts are being made to exterminate the mungoose in Trinidad. A reward of 5*s.* is being offered for each carcass of a female, and 1*s.* for the male.

The Agricultural Superintendent at St. Vincent is prepared to receive applications from parents or guardians of boys desirous of entering the Agricultural School.

The Antigua *Standard* suggests that a remunerative trade in pine-apples might be established by shipping to the Danish West Indian Fruit Co. Ltd., of St. Thomas.

A very dry year has been experienced at the Botanic Station at St. Kitt's, only 39·54 inches being recorded. This was 10 inches less than in 1902-3.

We have received from Mr. J. H. Hart, F.L.S., a fruit of the Souari or butter-nut tree of Demerara (*Caryocar nuciferum*). This was from a tree grown in the Botanic Gardens, Trinidad, from a seed imported fourteen years ago.

It is estimated that the total area under cocoa-nut cultivation in the Federated Malay States is 77,500 acres. In Ceylon the area under this cultivation amounts to over 800,000 acres. (*Board of Trade Journal.*)

In April last some fields of sweet potatos at Dodds, Barbados, were rather badly effected with thrips, which caused the plants to be defoliated. It was found, however, that the plants recovered without insecticidal treatment, and that the yield was not seriously reduced.

The *Board of Trade Journal* gives the number of bales of cotton imported into the United Kingdom from the British colonies and possessions during the three months ended June 30, 1904, as follows: British India, 98,288; British West Indies, 1,302; British West Africa, 372.

In connexion with the recent Arbor Day celebration in Jamaica, in May last, 6,870 plants were distributed free from the Public Gardens to 448 applicants. The plants most largely distributed were lignum vitae (929), palms (713), kola (661), eucalyptus (638), mahogany (485), moringa (411), and mahoe (389).

During the fortnight ended July 28, 115 bales of West Indian cotton were imported into the United Kingdom. As we go to press we learn that sales of St. Vincent Sea Island cotton have been effected through the British Cotton Growing Association at 15½*d.* per ℔., and Barbados Sea Island at 16½*d.* per ℔. The latter is reported to be very fine. (*West India Committee Circular.*)

The Jamaica *Daily Telegraph* of July 30, referring to announcements that a quantity of new and improved machinery has been obtained for two well-known sugar estates, states that there are welcome signs of a revival of the sugar industry in the island.

A notice in the Demerara *Argosy* of August 3, states that inquiries have been received for 'Carnauba wax, a material prepared by extracting the moisture from lacerated palm leaves.' The palm referred to is the sealing wax palm of Brazil (*Copernicia cerifera*), an account of which will be found in the *Agricultural News* (Vol. II, p. 307).

In his annual report the Inspector of Schools, Trinidad, states that the interest awakened some three or four years ago in the teaching of agriculture shows no signs of abatement. Of the 180 schools examined in this subject, thirty obtained the highest award 'Very good,' while 104 were classified as 'Good.'

An Agricultural Show was held at Lucea, Jamaica, on July 28. There was a good attendance in spite of bad weather. The exhibits were not as numerous as at last year's show, but a decided improvement in quality was noticeable, especially in the case of cured cacao. His Excellency the Acting Governor opened the show.

Generally speaking there appears to have been a decrease in the native cultivator's produce during last year, and an increase in jungle produce, due doubtless to the increasingly careful administration of the Forest Department. The increase both of imports and exports in Pahang is interesting as showing the steady development of that part of the country. (Federated Malay States *Agricultural Bulletin.*)

The annual report of the Director of Agriculture, published in the *Cyprus Journal* for June, records that the work of the Department in introducing machinery has met with encouraging success. The use of reaping machines, and ploughs is steadily increasing. The example of the Government in importing a steam threshing machine has also been followed. The native process of threshing is tedious, and the quality of the prepared grain poor. Cereal growing is the principal agricultural industry in Cyprus.

In a memorandum on the Jamaica sugar experiment scheme (see *Agricultural News*, Vol. III, p. 211), Mr. H. H. Cousins refers as follows to seedling canes: 'There are districts in the island where the seedling canes already at our disposal are capable of giving a return of at least 30 per cent. more sugar per acre than the Jamaica cane. The seasonable and irrigable areas should benefit with certainty from carefully controlled trials of the most promising seedling canes now in cultivation. Estate trials of ten varieties specially selected for local conditions have been arranged on twelve estates.'

The *Bulletin of Miscellaneous Information*, Trinidad, contains a report on logwood honey forwarded to the Imperial Institute from the Experiment Station. It is stated that honey is liable to considerable variation, but in this instance the sample compares very favourably with the recognized standard of genuine honey. The brokers to whom the sample was submitted for valuation report that it is of 'fair colour, clear, and would be worth about 20*s.* per cwt. in the London market.' For comparison with this valuation, the following prices of honey are given: Chili, 18*s.* to 30*s.*; California, 20*s.* to 40*s.*; and Jamaica, 16*s.* to 27*s.*

VIRGIN ISLANDS: ANNUAL REPORT ON THE EXPERIMENT STATION, TORTOLA, 1903-4.

The total expenditure on this station was £572 12*s.* 1*d.* The receipts from the sale of produce amounted to £26 5*s.* 8*d.*

The sugar battery was pulled down and completely rebuilt during the year. A new nursery shed was also erected.

The condition of the garden appears to be satisfactory. The work of improving its general appearance has been continued.

Vegetable seeds, plant tops of seedling cane B. 147, and pine-apple suckers were distributed.

In the experiment plots, cotton, sugar-cane, yams, onions, cacao, and other economic plants were grown. The results were fairly successful. The cacao plot is particularly promising and has demonstrated the suitability of this cultivation to parts of Tortola, provided wind-breaks are planted.

It appears that useful work is being accomplished by Mr. Fishlock for the improvement of agriculture in the Virgin Islands.

ST. VINCENT: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND LAND SETTLEMENT SCHEME, 1903-4.

Botanic Station.—Mr. W. N. Sands, having been appointed Agricultural Superintendent in succession to Mr. Powell, who left St. Vincent in November, took up his duties on March 4, 1904.

The expenditure during the year, including the cost of upkeep of the experiment plots, amounted to £595 16*s.* 4*d.* The sum of £45 15*s.* 6*d.* was received from the sale of plants, etc.

There was a very large increase in the number of economic plants distributed during the year. This increase was mainly due to the free distribution of plants to allottees under the Land Settlement Scheme.

The experiments in growing crops in volcanic ash were continued. The conclusions arrived at are clearly stated.

An account is given of the efforts made to establish a cotton industry in the island. The area planted last season was nearly 400 acres. Eleven experiment plots were also started during the year.

Agricultural School.—Mr. Knowles reports that there were twenty boys in the school at the beginning of the year; three others joined in August, and six have left during the year.

The value of the food crops grown in the experiment plots during the year represented a saving of £24 4*s.* 1*d.* on the food expenditure.

Satisfactory results were obtained at the two half-yearly examinations.

The boys assisted in making arrangements for the Agricultural Show held in March.

Each boy has a garden plot, 20 feet by 20 feet, in which he raises produce. Several of the boys obtained prizes for their exhibits at the Show.

This is a satisfactory report, and it is evident that good results are being accomplished.

Land Settlement Scheme.—The report of the Agricultural Instructor deals with the work in connexion with the allotments at Linley Valley, Cumberland Valley, Clare Valley and Questelles, Richmond Hill, New Adelphi, and Park Hill. The total number of allotments on these estates is 646.

Over 4,000 cacao, 108 nutmeg, 308 cinnamon, and 732 coffee plants were distributed to allottees.

The work of planting and supplying the wind-breaks was continued. Over 20 miles of wind-breaks are being planted.

On the whole, it is reported, the allottees appear to be taking an interest in their allotments and are producing satisfactory results. The Instructor gave instruction in the planting and care of crops, with demonstrations in pruning, manuring, etc.

BRITISH GUIANA: ANNUAL REPORT ON THE BOTANIC GARDENS, 1903-4. By A. W. Bartlett, B.A., B.Sc., F.L.S., Superintendent.

Mr. Bartlett took over the charge of the Botanic Gardens in November 1903.

The usual routine work was carried on during the year. From the nursery 10,904 plants were distributed to public institutions, etc.

The report includes an account of the work done at the Government House Gardens, the Victoria Law Courts Gardens, the Berbice Public Gardens, etc.

A long list is given of seeds available for exchange.

The receipts from the sale of plants, produce, etc., amounted to $1,039. This is an increase of $54 on the last year's receipts.

The total rainfall at the gardens during the year was 104·43 inches, exceeding the average for the last twenty-four years by 10 inches.

DEPARTMENT NEWS.

The Secretary of State for the Colonies has granted an extension of leave to Sir Daniel Morris, K.C.M.G., from September 5 to October 24, during which period Professor J. P. d'Albuquerque will act as Imperial Commissioner of Agriculture. It is expected that Sir Daniel Morris will leave England in the R.M.S. 'Trent' on October 12.

Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist and Agricultural Lecturer on the staff of the Imperial Department of Agriculture, left Barbados in S.S. 'Oruro' on Tuesday, August 23, for St. Vincent, for the purpose of inspecting the Agricultural School. Mr. Lewton-Brain was expected to return to Barbados to-day.

Mr. F. E. Bundy, Acting Agricultural Superintendent at St. Lucia, having obtained leave of absence, the Rev. L. Barlow has been appointed to act as Agricultural Superintendent until further notice.

WEST INDIAN PRODUCTS.

Canada.

Under date July 9, Mr. J. Russell Murray sends the following report on West Indian products in Canada:—

A considerable improvement is noticeable in general, and there is more inquiry for shipments during the last month than in the two previous months, but there is not the volume of trade that was anticipated. Agricultural interests have somewhat improved, though reports from Ontario indicate a shortness in several of the fruit varieties.

SUGAR.

The sugar market is strong, and European beet has again taken an upward move, to-day's quotation being 9*s.* 6*d.*, or within 1½*d.* of the point it touched on May 26, and all factors indicate a further advance. Local refiners advanced their prices to-day 5c. per 100 lb., but there is no active demand, and West Indian sugars remain quiet and practically unchanged. Fairly bright refining crystals and 89° syrup sugars would find a moderate outlet. The S.S. 'Larne' landed a cargo of 31,000 bags of Trinidad sugar last week, and the S.S. 'Oxonian' is expected in a few days with part cargo.

The prospects of beet culture in the Province of Ontario cannot be said to have improved, two factories having closed down recently notwithstanding the Canadian bounty of 50c. per 100 lb. and the import tariff for refined sugars of $1·24½ per 100 lb., which make a practical protection of $1·74½ per 100 lb. The bounty is to be continued for another two years.

MOLASSES.

The molasses trade is in a very uncertain condition, and little is being done. It is reported that a combination of buyers in the Maritime Provinces has been formed to purchase in bulk and fix selling rates, and a rumour of the formation of a similar corner in the Quebec market is also in circulation. Prices remain steady and the demand is good.

COCOA-NUTS.

The market continues steady, but the shortness of the supply of Jamaica nuts, hitherto depended upon, has given an opportunity for other islands to get a foothold, and if shippers will advise me of supplies available, I am in a position to secure them an opening and a profitable business. Shippers must be careful to ship only thoroughly ripened nuts. A shipment received to-day had many nuts evidently gathered before they were ripe, as shown by the whiteness of the fibre on the shell, and in every instance the nut was decayed. Prices are slightly lower, but good sound nuts command the full price.

FRUIT.

Limes.—Supplies continue to arrive in moderate quantities, but the continuous cool weather has retarded consumption, and the abnormally low price of lemons is also a potent factor in checking sales.

Pine-apples.—The market continues well supplied, and demand is good. The 'sugar-loaf' pine is not desired in this market.

Bananas.—Full supply, and demand is good.

SPICES.

Nutmegs.—Grenadas, steady and little demand.
Pimento.—Stronger.
Ginger.—Quiet and unchanged.

EDUCATIONAL.

School Gardens.

The *Bulletin of the Department of Agriculture*, Jamaica, for July, contains an interesting article by Mr. T. J. Harris on school gardens. The article is accompanied by a diagram showing how the garden should be arranged. We reproduce the following extract :—

The first work to be undertaken by the elementary school teacher is to lay out a garden in such a way as to permit of all the crops planted therein being neatly arranged in straight lines ; to effect this a regular systematic plan should be followed ; accompanying this note is a plan of a ¼-acre garden suitable for a school, in which it will be seen that the whole garden is an exact rectangle with an intersecting main path down the centre, and side paths leading from it to the garden fence to permit of inspection without trampling on the plots. The width of the main path is 6 feet, of the side paths 3 feet, and the five sections 24 feet; section No. 6 is 31¼ feet wide, making each side 151¼ feet long ; the width of the garden therefore, being 72 feet, this will make 10,890 square feet, or ¼ acre. For a smaller garden, say, one-half the size (⅛ acre), the same plan may be used, but the scale, of course, must be changed.

Having lined out the plots and paths, the temporary pegs which mark the sections should be replaced with permanent ones of hard wood to serve as points from which to measure when lining out for planting the various crops ; the surface soil of the paths should then be removed to the depth of 4 to 6 inches and scattered over the adjacent plots, stones or shells laid along the edge of the plots, and the path filled with gravel or sand. It is highly important that the children be allowed to assist in the laying out of the paths and plots, and if the teacher is careful to get correct right angles and parallels and exact measurements, he will not fail to enlist the interest of the children.

The work of planting may now commence, each section to be taken separately, beginning, say, with No. 6 ; reference to the plan will show this to contain bananas interplanted with cacao, and plantains with coffee ; the bananas are 12 feet apart and the plantains 8 feet. The cacao and coffee trees are not planted until the bananas and plantains are large enough to give sufficient shade. The lining out should be done as carefully as possible ; a glance at the plan will suggest the method to be employed.

The citrus section may be taken next, planting corn, when the proper season arrives, along the lines marked. The nursery will consist of a small seed and nursery bed, and later two rows of stocks set out for budding upon.

A careful study of the plan will render instructions as to the remaining sections superfluous ; it must be understood, however, that this plan is more suggestive than imperative ; numberless difficulties will beset the teacher, but it is felt that these brief instructions will be found useful when the work is taken up in real earnest.

Sumatra Tobacco in Jamaica. At the meeting of the Jamaica Board of Agriculture held on May 10, it was stated that a Cuban expert had reported that the Sumatra tobacco grown at Hope Gardens was of very good quality and could not be known from genuine Sumatra, and that it was better than that grown in Cuba. The value of the best leaf was estimated at from 6*s.* to 8*s.* per lb ; and inferior quality at about half that price.

MARKET REPORTS.

London,—August 2, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; and 'THE PUBLIC LEDGER,' July 30, 1904.

ALOES—Barbados, 13/- to 35/- ; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* to 1⅞*d.* per ℔.
BALATA—Block, 1/3 to 1/3½ per ℔.
BEES'-WAX—£7 2*s.* 6*d.* to £7 12*s.* 6*d.* per cwt.
CACAO—Trinidad, 58/- to 62/- per cwt. ; Grenada, 52/- to 57/6 per cwt. ; Dominica, 54/- to 56/- per cwt. ; Jamaica, 48/6 to 56/- per cwt.
CARDAMOMS—Mysore, 7½*d.* to 2/- per ℔.
COFFEE—Jamaica, good ordinary, 36/- to 38/- per cwt.
COTTON—St. Vincent Sea Island, 15½*d.* ; Barbados Sea Island, 16½*d.* per ℔.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—Jamaica, 10/- to 11/- per case.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Jamaica, common to middling, 31/- to 38/- ; fair to fine, 45/- to 55/- per cwt.
HONEY—18/- to 30/- per cwt.
ISINGLASS—West Indian lump, 2/6 to 2/10 ; cake, 1/2 to 1/3 per ℔.
KOLA NUTS—4*d.* to 7*d.* per ℔.
LIME JUICE—Raw, 1/2 to 1/5 per gallon; concentrated, £14 per cask of 108 gallons.
LIME OIL—1/6 to 1/7 per ℔., distilled.
LOGWOOD—£4 2*s.* 6*d.* to £5 ; Roots, £4 to £4 10*s.* per ton.
MACE—Fair to good pale, 1/6 to 1/9 ; red, 1/2 to 1/5 per ℔.
NITRATE OF SODA—Agricultural, £10 5*s.* per ton.
NUTMEGS—65's, 1/8 ; 85's, 11*d.* ; 105's, 8*d.* ; 125's 6½*d.* per ℔.
PIMENTO—3*d.* per ℔.
RUM—Demerara, 7*d.* to 7½*d.* per proof gallon; Jamaica, 1*s* 9½*d.* per proof gallon ; Leewards, 7*d.* to 10*d.* per proof gallon.
SARSAPARILLA—Jamaica, 7*d.* to 1/- per ℔.
SUGAR—Crystallized, 16/- to 17/- per cwt. ; Muscovado, 89°, 9*s.* 6*d.* on floating terms per cwt. ; Molasses, 11/6 to 15/- per cwt.
SULPHATE OF AMMONIA—£12 per ton.

Montreal,—July 9, 1904.—Mr. J. RUSSELL MURRAY. (In bond quotations.)

BANANAS—Jamaica, $1·10 per bunch of 8 hands ; $1·50 per bunch firsts ; $1·75 per bunch Jumbos, c. & f.
CACAO—Jamaica, 11c. to 12c. per ℔., c. & f.
CEDAR—Trinidad, 40c. per cubic foot, c.i.f.
COCOA-NUTS—Jamaica, $24·00 to $26·00 ; Trinidad, $21·00 to $23·00 per M., c. & f.
COFFEE—Jamaica, medium, 8½c. to 9½c. per ℔., c. & f.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per ℔., c. & f.
LIMES—Jamaica, $6·00 per barrel, c. & f.
MOLASCUIT—Demerara, $1·32 per 100 ℔., c. & f.
MOLASSES—Barbados, 22c. to 25c. ; Antigua, 19c. to 21c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 17c. to 18c. per ℔., c. & f.
PIMENTO—Jamaica, 8c. to 8¼c. per ℔., c. & f.
SUGAR—Grey Crystals, 96°, $2·50 to $2·60 per 100 ℔., c. & f.
—Centrifugals, 89°, $2·15 to $2·25 per 100 ℔., c. & f.
—Molasses, 89°, $2·00 per 100 ℔., c. & f.
—Barbados, 89°, $2·25 per 100 ℔., c. &. f.

New York,—August 5, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12¼c. to 13c. ; Jamaica, 9¾c. to 11½c. ; Grenada, 12c. to 12½c. ; Trinidad, 12c. to 13c. per ℔.
COCOA-NUTS—Trinidads, $23 to $25 per M., selected ; Jamaicas—$26·50 to $29.
COFFEE—Jamaica, fair to good ordinary, 7⅛c. to 8c. per ℔.
GINGER—Jamaica, 6¾c. to 7¾c. per ℔.
GOAT SKINS—Jamaicas, 52c. to 54½c. per ℔.
PIMENTO—4¾c. to 5c. per ℔., spot quotation.
SUGAR—Centrifugals, 96°, 4 3/32c. to 4⅛c. ; Muscovados, 89°, 3 9/16c. ; Molasses, 89°, 3 5/16c. per ℔.

INTER-COLONIAL MARKETS.

Antigua,—August 10, 1904.—Messrs. BENNETT BRYSON & Co., LTD.

MOLASSES—Markets closed.
SUGAR—$2·02½ per 100 ℔.

Barbados,—August 13, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·50 to $3·60 per 100 ℔.
CACAO—Dominica, $14·00 per 100 ℔.
COCOA-NUTS—$10·75 per M. for husked nuts.
COFFEE—Jamaica, $9·00 to $10·00 ; ordinary Rio, $11·00 per 100 ℔.
HAY—$1·20 per 100 ℔.
MANURES—Nitrate of soda, $60·00 ; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
MOLASSES—14c. per gallon (puncheon included).
ONIONS—Madeira (stringed), $1·75 to $1·80 per 100 ℔. ; Teneriffe, $1·19 to $1·25 per 100 ℔.
POTATOS, ENGLISH—$2·75 to $3·00 per barrel.
RICE—Ballam, $4·50 to $4·60 per bag (190 ℔.) ; Patna, $3·40 per 100 ℔.
SUGAR—in hhds., 89°, $1·95 (packages included) per 100 ℔. Dark Crystals—No quotations.

British Guiana,—August 11, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $8·00 to $8·50 per barrel.
BALATA—Venezuela block, 25c. ; Demerara sheet, 35c. per ℔.
CACAO—Native, 12c. to 13c. per ℔.
CASSAVA STARCH—$7·50 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 12½c. to 13c. per ℔. (retail). —Creole, 11c. per ℔.
DHAL—$4·25 to $4·50 per bag of 168 ℔.
EDDOES—$1·20 to $1·44 per barrel.
MOLASSES—Vacuum Pan yellow, 16c. per gallon (casks included).
ONIONS—$1·60 to $1·90 per 100 ℔., ex 'Saba.' ; Teneriffe, 1¾c. to 1½c. per ℔.
PEA NUTS—Curaçoa, 4c. ; American, 5¾c. to 6c. per ℔. (retail).
PLANTAINS—20c. to 36c. per bunch.
POTATOS, ENGLISH—Teneriffe and Madeira, $2·75 to $3·00 per barrel (retail).
RICE—Ballam, $4·40 to $4·50 ; Creole, $4·50 per 177 ℔., ex store.
SWEET POTATOS—Barbados, $1·20 per barrel, $1·08 per bag.
TANNIAS—$1·92 per barrel.
YAMS—White, $2·40 per bag.
SUGAR—Dark Crystals, $2·25 ; Yellow, $2·50 to $2·60 ; White, $3·50 to $3·75 ; Molasses, $2·00 to $2·15 per 100 ℔.
TIMBER—Greenheart, 32c. to 34c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75 and $5·50 per M.

Trinidad,—August 11, 1904.—Messrs. GORDON, GRANT & Co. ; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, $12·15 to $12·20 ; Estates, $12·35 to $12·50 ; Venezuelan, $12·50 to $12·75 per fanega (110 ℔.).
COCOA-NUTS—$18·00 per M., f.o.b.
COCOA-NUT MEAL—1¼c. per ℔.
COCOA-NUT OIL—70c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 6½c. per ℔.
COPRA—$2·70 per 100 ℔.
ONIONS—$1·40 to $1·60 per 100 ℔.
POTATOS, ENGLISH—$1·20 to $1·45 per 100 ℔.
RICE—Yellow, $4·25 to $4·40 ; White Table, $5·25 to $5·75 per bag.
SUGAR—No quotations.

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'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 63. BARBADOS, SEPTEMBER 10, 1904. PRICE 1*d.*

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Onion Cultivation.

AS mentioned in the last issue of the *Agricultural News*, 767 lb. of onion seed have been obtained by the Imperial Department of Agriculture from Teneriffe for planters in the West Indies. This amount of seed should be sufficient to plant nearly 200 acres.

Within the last twelve or thirteen years onion cultivation has been to a certain extent revolutionized—mainly in consequence of what is known as the 'New Onion Culture' put forward by Mr. T. Greiner in a little book of that title. The novelty of the method consists in transplanting the onions from seed beds. It has been demonstrated by experiments that the transplanting method has many advantages over the old style of sowing the seeds directly in the field. The yield is larger; the bulbs are of uniform size and mature earlier; much waste of seed is avoided, and the young seedlings can be looked after better.

On account of the smallness of the seed, special care is necessary in securing well-prepared nursery beds in which the seed is to be sown. These should be raised 1 foot or 18 inches, and the soil well pulverized. The seed should be sown in drills across the bed about 6 inches apart.

As ants are very liable to be troublesome at this time, a careful watch must be kept: it would probably be as well to spray the bed lightly, before and after sowing, with a dilute kerosene emulsion. Perhaps a simpler method—and one which has proved equally efficacious—is that recommended in *Pamphlet* no. 8, 'Cultivation of vegetables in Barbados,' (p. 3): 'The soil should be watered lightly with ordinary water, and then with a mixture of kerosene oil and water, in the proportion of one tea-spoonful of kerosene oil to 1 pint of water, which should be well shaken before and during use.'

It is as well, also, to afford some protection to the seed beds from heavy rains which would wash out the seeds: for this purpose 'cheese cloth' can be tacked to laths placed on posts about 4 feet from the bed. The seed should not all be sown at once, but at intervals, so that the seedlings may not be all of the same size when the time comes for transplanting.

The land chosen for onion cultivation should, if possible, be fairly rich and deep; it must be well drained and liberally manured. Absence of standing water must be insisted upon. In the manuring of onion fields a serious mistake has been made in using fresh farmyard manure; this has probably been one of the causes of the bacterial rot referred to in the *Agricultural News* (Vol. III, p. 245). The manure must be completely rotted before it is used. Finally, the land must be thoroughly cultivated and left with a smooth surface.

Now we come to the matter of transplanting. Full information on this part of the subject has already been given in the *Agricultural News* (Vol. II, p. 294-5), and we advise onion growers to read those pages carefully. The illustrations to the text show very clearly how this operation should be carried out.

Transplanting is most easily and conveniently done when the ground is freshly prepared, in which case the plants can be set with the finger. If the earth has been allowed to harden or cake, a small dibber will be necessary. (See fig. 23 in the article previously referred to.) The operation is made easier if the plants are carefully trimmed at each end. Figure 24 shows exactly how this should be done. It is important that onions should not be set too deep. The plants should be set about an inch deep; this will allow the bulbs to grow to full size, and not being buried too deep, they can be easily harvested. Figures 27 and 28 indicate the correct and the incorrect depths at which onions should be planted.

In addition to the articles that have already appeared in the *Agricultural News*, the following publications of the Department might usefully be consulted: *Pamphlets* 8, 16, and 21, and the *West Indian Bulletin*, Vol. II, pp. 163-6.

In connexion with the cultivation of onions in the West Indies, we might mention that onion boxes can be delivered from St. John's, N.B., at Barbados, c.i.f., at 10¼c. each.

SUGAR INDUSTRY.

Sugar-cane Experiments in British Guiana.

The following is a report, submitted by Professor J. B. Harrison, C.M.G., M.A., on behalf of the Sugar-cane Experiments Committee of the Board of Agriculture of British Guiana, on the results of the experiments with varieties of canes carried on on plantations during the crop season July to December 31, 1903. The committee has also published tables giving the mean results obtained with the different varieties:—

Twenty-four of the plantations which have placed their results at the disposal of the Board have carried on large-scale experiments during the crop, and the following shows the number of experiments made with certain varieties of canes, and the acreage occupied therewith:—

Variety.	No. of experiments reported.	Acreage occupied.
Bourbon	15	7,507
White Transparent ...	19	1,279
D. 109	17	987
B. 147	12	446
D. 95	3	52
D. 78	8	93
D. 145	10	99
D. 74	6	24
D. 625	11	123
Sealy	4	24

A large number of experiments with other varieties were reported, but as they were either small-scale experiments, in which each variety occupied a lesser area than 1 acre, or in which a variety had been experimented upon on less than three plantations, the results, although in many cases interesting, are not included in this report.

In the appended table of results the figures given are the mean figures deduced from the returns, the average of the experiments with a variety on a plantation being regarded as a unit. The following gives the mean yields and the true average yields of commercial sugar in tons per acre:—

Variety.	Mean.	Average.
D. 625	2·66	2·51
D. 109	2·09	1·95
B. 147	1·98	2·22
D. 95	1·96	2·06
D. 145	1·88	1·98
Bourbon	1·86	1·80
Sealy	1·83	1·72
White Transparent ...	1·64	1·73
D. 78	1·63	1·61
D. 74	1·50	1·87

The mean yields do not represent the actual yields per acre obtained as the areas of the experiments varied greatly, but as they are affected more by the locality of the experiments and less by the area in one locality than are the true averages, I think that they are the more reliable guides to the relative value of varieties.

The attached tables give, in the case of each variety reported upon, the means of the data supplied with regard to

both plant and ratoon canes, and to plant canes and ratoons separately. As comparison of the figures obtained from the experimental fields at the Botanic Gardens with those from estates given in a former report conclusively proved that no reliable deductions can be formed from small experiments with varieties of canes regarding their probable yields when cultivated under estates' conditions and on the manufacturing scale, I have not included in the tables any record from the experimental fields. These results will be found in the *Report on the agricultural work in the Botanic Gardens and the Government Laboratory* for the year 1903-4.

As in former years, the value of the data varies greatly, the results recorded where the experiments have extended over large areas and on several plantations being generally more reliable than where the areas are small and the number of experiments reported few.

The following shows the mean yield of each variety, in tons of commercial sugar per acre, during the years 1901-3, and the means of the yields of the three crop-years:—

Variety.	Crop of 1901-2.	Crop of 1902-3.	Autumn crop of 1903.	Means 1901-3.
D. 625	2·95	2·52	2·66	2·71
Sealy	2·49	2·08	1·83	2·13
D. 95	2·24	2·06	1·96	2·09
D. 145	2·17	2·17	1·88	2·07
D. 109	1·91	2·14	2·09	2·05
B. 147	1·99	1·95	1·98	1·97
Bourbon	2·18	1·76	1·86	1·93
D. 74	2·03	2·04	1·50	1·86
White Transparent	2·03	1·86	1·64	1·84
D. 78	1·39	1·83	1·63	1·62

The following shows the recorded yields of commercial sugar per acre by the varieties as compared with that of the Bourbon taken as 100:—

Variety.	1901-3. Bourbon as 100.	Variety.	1901-3. Bourbon as 100.
D. 625	140·0	B. 147	102·1
Sealy	110·3	Bourbon	100·0
D. 95	108·3	D. 74	96·3
D. 145	107·2	White Transparent	95·3
D. 109	106·2	D. 78	83·9

RELATIVE VALUES OF PLANTS AND RATOONS.

The following shows the mean returns, in tons of commercial sugar per acre, of the varieties of canes as plants and as ratoons:—

	Plants				Ratoons.			
Var.	1901.	1902.	1903.	1901-3.	1901.	1902.	1903.	1901-3.
D. 625	2·75	2·57	2·65	2·66	2·54	2·47	2·67	2·56
Sealy	No data	2·32	2·30	2·31	No data	1·83	1·67	1·75
D. 95	2·18	2·00	2·12	2·10	1·75	2·13	1·88	1·92
D. 145	2·20	2·18	1·89	2·09	2·21	2·17	1·88	2·09
D. 109	2·23	2·17	2·18	2·19	2·50	2·10	2·01	2·20
B. 147	2 20	2·25	1·90	2·12	1·81	1·76	2·05	1·87
D. 74	1·81	1·95	1·50	1·75	2·58	2·16	1·50	2·08
White Tr'nspt.	1·63	1·97	1·72	1·77	1·86	1·74	1·49	1·70
D. 78	1·62	1·75	2·49	1·95	2 40	1·92	1·15	1·82

This indicates, generally, that the varieties raised and selected locally are as a rule good ratooning canes, and that the imported Barbados varieties (White Transparent, Sealy, and B. 147) are not of equal merit with them in this respect.

(*To be concluded.*)

The Sugar Industry in the French West Indies.

The following letter from Guadeloupe, which appeared in the *Louisiana Planter* of August 6, contains an interesting account of the position of the sugar industry in Martinique and Guadeloupe:—

I have just returned from Martinique, where I have been sojourning some twenty days. All the sugar factories in that colony have completed their harvest of the cane crop and this latter has been generally very bad. The yield of sugar-cane has been from 25 to 30 metrical tons per hectare, or from 10 to 12 long tons per English acre, in place of 40 metrical tons per hectare, or 16 tons per acre, that are ordinarily obtained. This diminution of 25 per cent. in the crop is the disastrous result of the cyclone of August 8, 1903.

The yield of sugar has been also very bad, the factories which have obtained the most getting scarcely 8 per cent., or 160 lb. of sugar per short ton of cane. The average has been but 7 per cent., or 140 lb. of sugar per short ton of cane. The average yield in molasses has been from 3 to 4·2 per cent. of the weight of the cane.

In Guadeloupe the harvest of the cane crop has also been completed, all the central factories having ceased operations early in June. The results here have been better than in Martinique. The yield of the fields in cane has been about 40 to 45 metrical tons of cane per hectare, or 16 to 18 long tons of cane per English acre, and the yield in sugar has been about 9 per cent. of the weight of the cane, or 180 lb. of sugar per short ton of cane. The yield of molasses has been less than that of Martinique and is about $2\frac{1}{2}$ to $3\frac{1}{2}$ per cent. of the weight of the cane.

This colony, although it has fewer central factories than Martinique, produces generally more sugar. The yield in sugar in Guadeloupe has always been greater than that obtained in Martinique, which is attributed to the quality of the lands giving canes of higher saccharine content and with juice of greater purity.

On the other hand, the yield in rum, or tafia, obtained in Martinique, has always been greater than that obtained in Guadeloupe, which is attributed first to the quality of the molasses, and secondly, to the method of manufacture. In Martinique they convert into rum all of the molasses produced in the manufacture of sugar in the factories and a large part of the molasses made in Guadeloupe. All the rum is exported to France. The rum consumed in the country is produced in plantation distilleries, which manufacture it directly from the juice in the cane. The latter is taken sometimes raw and sometimes concentrated by evaporation to 15 or 20 degrees Beaumé. The rum thus obtained is much finer and much more highly appreciated by the local consumers. Guadeloupe produces very little rum for export, only six factories distilling their molasses, the others delivering their molasses to the distilleries of Martinique.

The sugar industry of both Martinique and Guadeloupe is much behind in the matter of the progress realized in the sugar industry elsewhere during recent years. In order to arrive at the best results our factories would need to be much improved.

WEST INDIAN FRUIT.

THE BANANA INDUSTRY IN THE CANARY ISLANDS.

Considerable space is devoted in the *Consular Report* on the trade of the Canary Islands for 1903 to the banana industry. We give the following summary, which is of particular interest in view of the development of the industry in these islands :—

During the year 1,879,258 crates, of the value of £375,851 were exported, as against 1,656,876 crates, valued at £284,320, in the previous year.

It might reasonably have been anticipated that the prices of the fruit would decrease in proportion as the output increased, but such has not been the case. Even although a considerable amount of land has been brought under irrigation since 1900, prices have maintained a steady upward movement. It is confidently expected that prices will not only be maintained but continue to rise. Pessimistic views are, however, also held. In consequence of the introduction of Jamaica bananas into the United Kingdom, shipowners deemed it advisable to meet the threatened competition by a reduction of freights. Competition among the shipping companies has also benefited the farmer, and an impulse has been given to increased cultivation. A further cause of the rise in values was the storm in Jamaica, which induced the belief that, for a considerable time at any rate, there would be short supplies in the United Kingdom.

Although it is anticipated that freights may be raised and prices fall owing to Jamaica bananas resuming their place on the British market, some authorities are of opinion that growers have a sufficiently large margin of profit to allow for a considerable reduction in prices, and that the trade has a fair future before it, especially if the proposed irrigation schemes are carried out.

In a note added later it is stated that the prices have dropped considerably owing to increased arrivals from Jamaica.

PINE-APPLE CULTIVATION IN FIJI.

Indian Planting and Gardening has the following short article on pine-apple cultivation in Fiji. It will be seen that in several respects methods differ from those practised in the West Indies :—

Our Fiji pines are all exported and find a market in Australia and New Zealand. We do not do any canning here, but ship the fruit whole in cases, averaging about thirty pines to the case. The nature of the country and climate of Fiji, however, are far more suited to the growing of bananas or plantains than pines: but unfortunately, the hurricanes we experience severely injure the bananas and do not harm the pines.

Climate and Soil required.—Pines require a moderately dry climate, otherwise they get too watery and soft, and then will not travel well when shipped. A loose, friable soil of a sandy nature is best. I generally plant 5 x 5 feet, so as to permit of subsequent crops maturing properly.

Suckers for Planting.—The young healthy suckers near the bottom of the parent plants are the best for planting. From such the fruit will be ready for cutting in about twelve months. From the head or top shoot when planted fruits take nearly two years to come to maturity, but from these it is a good plan to get a change of seed. Do not plant any suckers that have flowered, as the crop from these would be very small. The correct time to take the suckers for planting is before the fruit has been cut from the parent plant.

After the third year of cutting it is advisable to replant, and if possible not on the old land, but select new soil.

Cost and Labour.—If the land is heavily timbered it would cost £4 per acre to bring it into bearing in Fiji. After being planted one man can keep 15 acres clean—it must be kept very clean - but more labour is required during crop time.

MOSQUITOS AND MALARIA.

The following reference to the successful efforts that have been made to remove the cause of malaria at Ismailia occurs in the *Consular Report* on the trade of Port Said and Suez :—

In 1902, the Canal Company invited Major Ronald Ross to come out on a special mission in order to deal with the question of mosquitos in connexion with the malarial fever which for many years had proved a scourge at Ismailia. The report says : 'Mosquito larvae developing exclusively in stagnant water, our first efforts were to deal with the marshy soil round the town. Several large pools were filled up, and where this could be done narrow trenches were dug and currents of water maintained in order to prevent the larvae from remaining. A staff was also organized for the regular inspection of buildings, and petroleum was freely used in all tanks, etc., which could not be filled up. These measures, combined with the obligatory employment of quinine, have produced the most satisfactory and decisive results. Not only have the mosquitos entirely disappeared, but the cases of fever have also diminished, and it may be regarded as certain that in the very near future malarial fever will definitely cease at Ismailia.'

COTTON INDUSTRY.

The Cotton Industry in the West Indies.

The Jamaica *Gleaner* publishes a letter from Sir Daniel Morris from which we take the following extract relating to the cotton industry :—

I was very much impressed with the high opinion that has been formed of our cotton in Liverpool. I had a long conversation with brokers who have dealt with recent shipments, and they assured me that they could receive at least 30,000 bales of Sea Island cotton without affecting prices. Spinners of long-staple have taken a special interest in West Indian cotton. They like it better than Egyptian and are prepared to give good prices for all our best qualities, such as are being shipped from Barbados and other islands.

Everything I have seen and heard on this side is distinctly favourable to the idea of establishing cotton in the West Indies.

Sales of St. Vincent Cotton.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, has forwarded the following information, abstracted from recently received account sales, relating to the first shipment of St. Vincent cotton. The cotton was shipped to the British Cotton Growing Association:—

The Sea Island realized 15*d.* per lb. and the Cannouan and Union Island varieties from $7\frac{1}{2}d.$ to $7\frac{3}{8}d.$ per lb. Reports of subsequent shipments show that the Sea Island has been sold at prices ranging from 14*d.* to 15*d.*, but the account sales have not yet been sent out.

These prices may be considered very satisfactory to all concerned.

The first shipment consisted of 29 bales of Sea Island, 27 selling at 15*d.* The two remaining contained a mixture of cottons.

The other 10 bales were the local varieties, making the total of 39.

Cotton Cultivation in Jamaica.

The following extracts from a report by Mr. John Barclay, Secretary of the Jamaica Agricultural Society, on cotton cultivation are of interest in showing what is being done in the way of experiments in Jamaica, and further contain various useful hints :—

I visited two of the largest plots in the island, that of Mr. Fursdon at Two Mile Wood and those of the Hon. T. H. Sharp at Angels and Eltham, near Spanish Town. I found Mr. Fursdon busy superintending the ginning of Egyptian cotton forwarded to him from settlers in the Pedro Plains. At the very outset there was a lesson to be learnt here. The cotton had been picked at least three weeks before it was fit; it had been carelessly picked, and was mixed with such foreign matter as bits of leaves and sticks and even bits of paper ; it looked dirty as if some of it had been taken up from the ground. This involved a great deal more trouble and labour in the ginning. Egyptian cotton is of a slightly yellowish-brown colour, but the colour of this cotton had been much deepened by its being packed in bags stained with red earth.

So far, Mr. Fursdon's is the only ginnery in the island. The gin is the one presented by the British Cotton Growing Association to the Government. The staple of Egyptian cotton being shorter than Sea Island, the gin has to be set closer to take the lint from the seed, so that it is very necessary that the two varieties should not be mixed. It is fortunate that this gin is already working smoothly. Mr. Fursdon has about 10 acres of cotton, part of it being Egyptian and part Sea Island. The Egyptian variety grows into a larger bush than the Sea Island, but I did not notice here that there was any distinction in their relative vigour ; both crops were in good condition. The Sea Island had been planted a month later and was just beginning to blossom. The plants were not over 3 feet high, while the Egyptian stood 4 to 5 feet high with the bolls already opening, showing the seed-cotton. Indeed a little of it was ready to be picked.

Mr. Sharp has 10 acres of Sea Island cotton planted at Angels. This crop, planted in April, was nearly all coming into blossom, some of the most forward plants already having ripe bolls on them. The rainfall in this district is very light, but the Sea Island plants stood about 3 feet high and would evidently produce a very high rate of cotton per acre. Further down towards Spanish Town, at Eltham estate, Mr. Sharp has 10 acres more of cotton through an orange grove. Half of this cultivation is Egyptian and half Sea Island. I saw no insects but ants and stainers on the cotton. The Sea Island plants stood from 3 feet to over 5 feet in height. Some of the pods of Egyptian cotton are already ripening, and the first general picking will be made next week. While there will be a great crop here, I do not think it will be as much as if the plants had been further apart.

Mr. Sharp has also 10 acres of cotton planted at Inverness and about the same acreage at Colbecks. While I am glad to say that neither of these cultivations has been troubled by caterpillars, as some cultivations have on the north side, I am sorry to say that the stainer is in very great numbers at Hartlands and at Eltham and may depreciate the value of the cotton by discolouring it. I did not notice any of these insects on the Sea Island cotton at Angels. Experiments are being tried with various mixtures to attract these insects from the cotton and kill them, as hand-picking would prove too expensive.

RUBBER IN JAMAICA.

The following brief note on the cultivation of rubber trees in Jamaica, which appeared in the *Bulletin of the Department of Agriculture,* is of interest :—

It has been universally understood that with the exception of the Ceara rubber, other rubber plants only succeed in districts that are moist ; and the planting of rubber trees has not been pushed in Jamaica for fear of interfering with the cacao and banana industries. Large numbers of plants, however, especially of Castilloa, have been distributed from the Gardens with a recommendation to plant them along fences to serve as fence posts, if they turned out to be of no value for the rubber.

Experiments have been made in growing Castilloa, the most promising for Jamaica, both at Castleton and Hope Gardens. Contrary to expectation, it has been found that Castilloa succeeds better in the open than under shade, and this has been confirmed by experiments made by Mr. J. Shore at Cinnamon Hill.

In the extracts now appearing in the *Bulletin* on Castilloa in Central America, by Professor Cook, it is shown that a dry season seems to be necessary for the full supply of rubber.

It will be well therefore to experiment with Castilloa in districts where bananas and cacao do not thrive.

RABBIT KEEPING IN THE WEST INDIES.

The following is the concluding portion of Mr. Barclay's notes on rabbits. This instalment deals with the common ailments of rabbits:—

DISEASES.

While rabbits are hardy, they are, like many other animals, subject to certain troubles. It would serve no purpose to describe many of these here fully. They all arise from (1) errors of diet, (2) bad housing—exposure to draughts and rain, (3) dirt, or (4) inbreeding.

If a rabbit looks out of sorts, look to your treatment generally. (1) See that your hutch is water-tight. (2) See if wet green stuff is being fed, and if so, stop it; diarrhoea is the result of feeding this sort of food. (3) See that too much corn or dry stuff is not being fed; this results in constipation. If so, give only green food and sweet potatos. The following preventive and curative treatment should then be immediately acted upon. [Remember that rabbits have claws and that the kick of their hind legs can give a deep scratch. They also bite, though not badly.] Lift by the ears with one hand, supporting the rabbit by holding the thighs with the hand. Sit down and place the animal between your knees, pressing it gently with them, pinch the side of the mouth with your fingers when it will open a little, insert a tea-spoon not quite filled with castor oil and dip it into the throat. Then by the ears pull the head up gently and hold the mouth, when the oil will be swallowed. The next day give sweet oil (cocoa-nut, cotton-seed, olive, etc.) instead of castor: repeat the castor oil on the second day, and the day after sweet oil again. Then stop.

This is a general preventive treatment when illness is not specifically diagnosed. Reduce dry food and increase the green food. This is especially the food for preventing constipation. For diarrhoea give the same doses of castor oil and sweet oil, but increase the dry food and reduce the green food. Especially good for diarrhoea is a little dry boiled rice—not sloppy.

Cold in the Head.—This is often caused by a crack in the hutch which causes the rabbit to be always in a draught. See to this at once. Remember prevention is always better than cure. If the rabbit has taken cold it will be constantly sneezing and running at the nose.

Give warm food, such as bread and milk, boiled sweet potatos, served warm, mixed with a little cornmeal; in each feed put eight drops of sweet spirits of nitre, and if the rabbit will not eat its food when this is mixed with it, put the spirits of nitre in a little milk and pour down its throat.

Constipation.—I have referred to this above. This complaint only makes its appearance when there has been a lack of herbaceous food. The symptoms are as follows: The rabbit is seen sitting in one corner of the hutch taking no notice of food, and sometimes the body is swollen.

It must be tempted to eat green food, such as Spanish needle, 'Rabbit Feeding,' banana or cabbage leaves. Should this fail to bring about the desired result, put a little salt and water down its throat; put in just enough salt to make the water saline, and put a few drops of 'Healing Oil' in it. A few days of this treatment will put matters right.

Diseased Liver.—This is a complaint the rabbit keeper must be on the lookout for, as any sign of diseased liver will spoil the sale of his produce. There is a difficulty in breathing which is heavy and sometimes audible, and the rabbit should at once be killed. It is little use trying to doctor, in fact, it is not worth the trouble unless the animal is a very valuable one.

In case a remedy is wanted, the following will be useful:—Give twice a day a tea-spoonful of castor oil, and plenty of young 'Spanish needle' amongst the green food. This disease will be prevented by not allowing the rabbit to eat off the floor, and by avoiding feeding corn, and cornmeal much.

Dropsy or Pot Belly.—This is one of the commonest of rabbit diseases and one to which the young stock are most liable. An excess of wet green food in large quantities, or large quantities of the same fed at irregular hours, or hutches too small—these are the general causes.

The animal's body becomes swollen, as the rabbit will keep on eating, if allowed; the complaint is aggravated and death soon ensues.

Induce it to have a run on dry ground. Give dry food, such as a few peas—leaves of the banana or plantain are good—and give a little parsley, thyme, or sliced carrots; but any other green food or roots must be given sparingly. A proper allowance of sweet hay and corn with limited green food, fed at regular hours, is the prevention.

Snuffles.—A common disease is a form of cold, called 'Snuffles.' The animal sneezes repeatedly and matter collects on its nostrils. Put a pinch of permanganate of potash in water, and bathe the nostrils, then touch them with eucalyptus oil. Do this daily until better: keep the animal dry and comfortable. It is exposure to damp, often the drip in a leaky house, that causes snuffles, and if neglected, this may turn into consumption, which is incurable.

If a rabbit becomes very bad before it is noticed, it is better to kill it than attempt a cure.

FISH OILS FROM DOMINICA.

The Dominica *Guardian* makes the following reference to the note in the *Agricultural News* (Vol. III, p. 233) on the above subject:—

This industry has heretofore received too little notice here, albeit one that promises development as well as reward to those who would embark in an organized venture in that direction. Sharks are pretty common in our waters, but it is only lately that the fishermen bring them to the shore, little regard being paid to the value of its oil, which is very seldom extracted.

Shoals of black fish prank in the offing at all hours, but they are seldom interfered with, and only occasionally do we see one being taken to the market, probably when other fish are scarce. These are sold in large junks for a couple of pence which makes the catch scarcely worth the fishers' while. In some instances the oil has been extracted, and here again there is discouragement, there being no market for it. We know of one or two instances where ventures at shipment have been made, with poor results, probably because the shippers did not know where to go to with the article, as most certainly £15 to £18 per ton would give a fine margin of profit. Now that the Department of Agriculture has taken the matter to a certain extent in hand, with good results, it is to be hoped that they will not allow it to rest there.

CONTROLLING SOIL MOISTURE IN THE ORCHARD.

This important subject has been referred to at various times in the publications of the Imperial Department of Agriculture, particularly in the *West Indian Bulletin* (Vol. II, p. 96; Vol. IV, p. 176), and the *Agricultural News* (Vol. II, p. 187). It is further dealt with in the *Report of the Fruit Growers' Association of Ontario*, 1902, by Professor J. B. Reynolds. We give the following short summary of this interesting paper:—

The first point to consider is the proper preparation of the land before planting. The drainage of the land must receive attention; if the land is naturally well drained, artificial drainage will not be necessary. Then the soil must be thoroughly loosened so that the roots may be encouraged to go deep instead of keeping to the surface.

Next, let us consider the various methods of treating the soil after the trees have been planted. One method is to put the orchard down to permanent sod. This method, which has obvious advantages, is not to be universally condemned; its advisability will depend upon the locality. East of Toronto, where the rainfall is greatest, the sodding of orchards is not found to be unfavourable to the production of fruit. To the west of Toronto, on the other hand, this practice is rather objectionable from the point of view of soil moisture, and it is a question whether we can afford the withdrawal of the moisture from the land occasioned by the growing grass. The diminution of the water supply causes the apples to ripen earlier in the season, and therefore sodding cannot be approved in districts where moisture is scarce. Cropping is also a question of local climate. The orchard may be profitably cropped where the soil is rich enough to stand it, and the soil moisture is plentiful enough. It appears to me that, subject to the exceptions mentioned, the safest plan is not to sod an orchard nor to crop it, in the ordinary sense, but to use a 'cover crop,' that is to say, a crop sown late in the summer, or early in the autumn, allowed to remain as a cover to the land during the winter, and ploughed down the following spring.

It must be clearly understood that no particular system of soil culture for orchards can be recommended without a particular study of local conditions.

THE DATE PALM IN INDIA.

In the *Report on the Botanical Gardens at Saharanpur and Mussoorie*, the Superintendent gives the following summary of his experiences with the date palm (*Phoenix dactylifera*):—

It has been conclusively proved that date palms under ordinary care thrive well at Saharanpur. When the trees have attained to some age, ten years and over, they flower and set fruit profusely; but only a very small percentage of the fruit ripens in normal seasons, and even in our abnormally dry seasons, one or two small showers of rain are sufficient to destroy the bulk of the crop. Date palms may, therefore, be successfully grown for ornamental purposes anywhere in the province; but for food, in seasons of late or light rainfall, the quantity of fruit that may be counted on to ripen is so small as not to be worth taking into account.

ONION CULTIVATION IN EGYPT.

The following account of onion cultivation in Egypt is taken from *Bulletin* No. 62 of the Bureau of Plant Industry of the U. S. Department of Agriculture, entitled: 'Notes on Egyptian Agriculture':—

Onions are grown to a considerable extent in Upper Egypt (not less than 15,000 acres), largely on the islands which appear after the fall of the Nile and on the banks of the river. They are also grown on ordinary soils under perennial irrigation. Although two or three varieties are recognized, that known as the Saidi forms the bulk of the export trade. The crop grows to the greatest advantage on deep, loamy soils, inclining to sandy, and possessing a considerable amount of humus.

Seed is sown in a manured seed bed in September. About one-ninth of a bushel of seed sown on 350 square yards of land provides sufficient plants for 1 acre.

The land for onions should be well prepared by two or three ploughings, reduced to a friable condition, and made into ridges about 2 feet apart. The seedlings are pushed in the sides of the ridges (both sides) by the fingers and are left about 6 inches apart.

On the islands and river banks the land is not ploughed at all, but the seedlings are sown on the flat, either singly in rows about 14 inches apart, or in bunches in rows 20 inches apart. In this case the crop is not watered during growth.

The operation of transplanting is done in November and December on the islands and river banks, but later on ordinary lands even up to January and February.

The crop requires careful cultivation to prevent the growth of weeds, and a small hoe is employed to keep the land well stirred. During the first month after transplanting, the crop must be hoed and weeded, and this must be repeated during the second month.

Onions respond to liberal manuring. Barnyard manure is employed, and on the alluvial deposits this is put under the plants at the time of transplanting, but on other land it is applied from one to one and a half months after transplanting and as a rule before any water is applied. Small quantities of *coufri* are sometimes used, though barnyard manure is in greatest favour.

On ordinary perennial irrigated lands six or seven waterings are given during the growth of the crop. These should be light and not sufficient in amount to soak the soil.

About five months after transplanting, the bulbs have attained full size and the leaves become yellow. The crop is now ready to lift, and no water should be applied for nearly a month before harvesting; otherwise a second growth commences.

The bulbs are removed and exposed to the sun for two days, the tops being then removed, and another day allowed for drying.

Early in April the onion crop arrives at Alexandria for export, the first arrivals realizing the highest price. The product per acre amounts to 5 to 6 tons, on an average, on good soil. Care has to be taken in storing. If not thoroughly dried many of the onions will sprout, and those which have been injured or bruised will decay. The average price is from £2 to £3 per ton.

The following figures indicate the export trade:—

1899,	76,568	tons	to the value of	£236,498.
1900,	76,034	,,	,, ,,	£157,670.
1901,	64,935	,,	,, ,,	£133,986.
1902,	49,933	,,	,, ,,	£103,842.

The bulk of the crop is sent to England, and the rest chiefly to Austria.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 271 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, SEPTEMBER 10, 1904. No. 63.

NOTES AND COMMENTS.

Contents of Present Issue.

In our editorial we draw attention to some of the more important points connected with the growing of onions. The short article on p. 295 on the cultivation of onions in Egypt is also likely to be of interest.

The first portion of a progress report on the sugar-cane experiments that have been conducted on estates in British Guiana is given on pp. 290-1. This report will be concluded in our next issue. A short review of the last season's operations on sugar estates in Guadeloupe and Martinique will be found on p. 291.

On p. 292 we publish information relating to the banana industry in the Canary Islands. It will be seen that the trade with the United Kingdom has been considerably affected by the imports from the West Indies.

From our cotton notes it will be seen that the prospects of establishing a cotton industry in the West Indies are considered by persons connected with the trade in England to be encouraging. We also publish extracts from a report on experiments in cotton growing in Jamaica.

In the present issue Mr. Barclay concludes his interesting and useful notes on rabbit keeping. Hints are given as to the treatment of the diseases of rabbits.

On p. 298 a review is given of the present position of the experiments that are being carried on in the United States against the Mexican cotton boll weevil. Although this pest has not, fortunately, so far, appeared in these islands, it is considered desirable that planters should be supplied with information as to the methods which have been found necessary for combating it.

Lectures on Cotton Cultivation.

In connexion with the lectures on cotton cultivation being arranged by the Imperial Department of Agriculture, the following fixtures have been made in St. Vincent:—The Court House, Kingstown, on Wednesday, August 31; the Barracks, Colonarie, on Monday, September 5; the Schoolroom, Stubbs, on Tuesday, September 6; the Schoolroom, Campden Park, on Monday, September 12; the Schoolroom, Barrouallie, on Wednesday, September 14.

His Honour the Acting Administrator will preside at the first lecture, and all the lectures will be fully illustrated by lantern slides. The lecturers will be Mr. W. N. Sands and Mr. C. H. Knowles, B.Sc.

Cocoa-nuts for New York.

Hemingway's 'London Purple' Co., Ltd., has addressed a letter to the Imperial Commissioner of Agriculture asking for information on the situation of the cocoa-nut oil industry in the West Indies.

The firm desires certain information, the nature of which will be gathered from the following extract:—

'We may shortly be interested in an enterprise for the manufacture of cocoa-nut oil, and would be glad to have particulars as to the localities in which cocoa-nut palms are abundant; also as to the cost of land in these sections and the usual terms of land tenure. The above points are of particular interest. We should also be very glad if you could put us in the way of ascertaining at what price we could buy a good grade of cocoa-nuts already picked and delivered at different points.'

The Mexican Cotton Boll Weevil.

We publish on p. 298 extracts from a recently issued bulletin on the Mexican cotton boll weevil. As is well known, this has proved a most serious pest, and there are indications that it will spread further and further. Yet it has been demonstrated that 'a crop can be grown profitably in spite of the boll weevil.' But this is possible only when great attention is given to cultural methods.

The efficacy of these cultural methods against insect pests is not sufficiently realized in the West Indies, the tendency being to think that the application of insecticides will always put things right. In several of these islands we have noticed old cotton plants left standing long after their period of usefulness has passed. Such a practice only serves to give additional opportunities for the development of pests. As soon as it becomes apparent that no more cotton will be produced on the plants, they should be pulled up and buried, or, in the case of plants obviously affected by some pest, burned.

It has further been demonstrated that the boll weevil is distributed with seed: this fact furnishes an additional argument for the sterilization of all seed before sowing, as has been done in the case of seed distributed by the Imperial Department of Agriculture. It would also be advisable to fumigate the seed in the chambers that have been, or are being, erected for the fumigation of imported plants.

Rabbit Keeping in the West Indies.

The notes on 'Rabbit Keeping in the West Indies' which have been written by Mr. John Barclay, Secretary of the Jamaica Agricultural Society, for the *Agricultural News*, are concluded in the present issue. These articles were commenced in our issue for July 16. They have dealt with the breeds of rabbits, their proper housing, breeding, and feeding, while the last instalment is devoted to the treatment of diseases. Mr. Barclay has clearly shown that care and attention are necessary to make rabbit keeping a success, but that when intelligently taken up the rearing of rabbits is likely to prove remunerative.

Fumigation of Imported Plants.

We are glad to learn that an Ordinance (No. 9 of 1904) has been passed by the Legislative Council of Dominica, and has received the Governor's assent, to provide for the fumigation of plants imported into the presidency. This Ordinance is based upon that in force in Jamaica which has given entire satisfaction.

It ordains that all plants imported shall be delivered up to the Treasurer who shall cause them to be conveyed to the agricultural authority (the Curator of the Botanic Station) for fumigation; that plants shall be landed only at the port of Roseau; that the process of fumigation shall be conducted by the agricultural authority in such a manner as he may consider adequate for the destruction of any vegetable or insect pests which may possibly be on such plants; that all plants shall be removed by the owner from the Botanic Station immediately on his being required to do so.

The Ordinance further states that the expenses of removal to the place of fumigation and of the fumigation shall be borne by the Government, but that the Government shall incur no liability in respect of any risk attending fumigation.

Cotton Experiments in Trinidad.

In the *Bulletin of Miscellaneous Information* Mr. J. H. Hart, F.L.S., Superintendent of the Botanical Department, reviews the experiments that have been carried on with cotton in Trinidad.

At the St. Clair Experiment Station the trial of Sea Island cotton was not a success, the plants being badly attacked by insects. Better results were obtained with Upland or Creole cotton, which did not suffer in this way. Samples sent to the Imperial Institute were reported to be superior to American Upland and to be worth about 9*d.* per lb. Sea Island cotton from Princes Town district, ginned at the station, obtained a price of 15*d.* per lb.

It is evident that serious efforts are to be made to carry on experiments during the ensuing season. Over 2,000 lb. of seed have been obtained through the Imperial Department of Agriculture, and a large amount has been distributed. Experiment plots are to be started at Diego Martin reformatory, River estate, Cedros, Dabadie, and St. Clair with Sea Island cotton, with a view to proving whether this variety is suitable for cultivation in Trinidad.

Fibre Plants in Mauritius.

The *Journal d'Agriculture Tropicale* for March contains a paper by M. Boname on the fibre industry in Mauritius. The plant that is cultivated for fibre is *Furcraea gigantea*, called the 'green aloe' to distinguish it from the 'blue aloe' (*Agave americana*).

The exports of fibre from Mauritius have varied from 358 to 3,000 tons annually. The machine used for extracting the fibre is very primitive and similar to the Mexican 'raspador;' it is worked by water or steam power. It is estimated that, on an average, 88,000 lb. of leaves are required to yield 1 ton of dry fibre. M. Boname sets forth very clearly the superior claims of the sisal plant as a source of fibre. As the result of experiments it has been shown that the sisal plant gives 60 per cent. more fibre from a similar weight of leaves than the *Furcraea*. The sisal fibre is much easier to extract and clean, the price in foreign markets is higher, and the yield is greater.

Agriculture in Bermuda.

According to the *Annual Report* on Bermuda for 1903, there was a considerable increase in the value of the exports during the year. The principal exports were arrowroot, bulbs, hides, onions, potatos, and miscellaneous vegetables. The exports of onions amounted in value to £55,340; these were shipped almost entirely to the United States. The value of the exports of potatos was £33,945.

There is in the colony an arrowroot factory equipped with a modern plant. The product of this factory is of excellent quality and commands a good price. The value of the exports of arrowroot (to the United Kingdom) was £1,184. Hope is expressed that this trade will grow, as the manufacture of arrowroot was at one time an important industry.

The crops of potatos and onions were average ones; higher prices were obtained for the onions than in the previous year, but the prices of potatos were low all through the season. The lily crop was small, and prices were low; consequently, there was a large falling off in the value of the exports of lily bulbs.

There was an appreciable increase in the exports of vegetables other than potatos and onions, and it is stated that a much larger quantity would be exported to New York, if greater facilities for cold storage accommodation were offered.

At the Public Gardens, which are supported chiefly as an agricultural experiment station under the Board of Agriculture, an experiment in the growing and curing of tobacco was conducted during the year. A portion of the product was forwarded to the Imperial Institute for a report. Several thousand Panama-hat plants (*Carludovica palmata*) were raised from seed and distributed. A silo has been erected at the garden, and it has been demonstrated that ensilage might with advantage be generally made by farmers in the colony. Reference is made in the report to the arrangements that have been made with the Imperial Department of Agriculture for the services of an agricultural lecturer.

INSECT NOTES.

Mexican Cotton Boll Weevil.

For ten years past the Mexican cotton boll weevil has been a pest of importance, steadily spreading through the cotton-growing region of Texas, and so difficult has it been to control, that many statements have been made regarding its destructiveness, present and future. The United States Department of Agriculture has made an exhaustive study of the life-history and habits of this pest and has recently issued a bulletin covering all the work to the end of the season 1903—Division of Entomology, *Bulletin* No. 45. The following notes consist chiefly of extracts from this bulletin, and in view of the many extravagant statements which have appeared from time to time in various newspapers, these extracts should be of interest to cotton growers in all parts of the world:—

The Mexican cotton boll weevil (*Anthonomus grandis*, Boh.) has the unique record of developing in less than twenty years from a most obscure species to undoubtedly one of the most important economically in the world. Before the advent of the boll weevil into Texas, unfavourable weather at planting time, summer droughts, and heavy falls of rains caused very short crops to be produced. Now, however, the tendency is everywhere to attribute all the shortage to the weevil. Nevertheless, the pest is undoubtedly the most serious menace that the cotton planters of the South have ever been compelled to face, if not indeed, the most serious danger that ever threatened any agricultural industry. In spite of the generally serious outlook, however, it must be stated that fears of the damage the weevil may do are very often much exaggerated, especially in the newly invaded regions. It is not at all necessary to abandon cotton. The work of the Division of Entomology for several seasons has demonstrated that a crop can be grown profitably in spite of the boll weevil, and this experience is duplicated by many planters in Texas. The infested area . . . includes about 30 per cent. of the cotton acreage of the United States, which produced in 1900 about 35 per cent. of the total crop of the country, or about one-fourth of the crop of the world for that year. It seems safe to predict that in fifteen to eighteen years the pest will be found throughout the cotton belt of America. Although there are no truly cosmopolitan cotton insects, it seems likely that the boll weevil may eventually be more widely spread than any other.

Cultural methods have been proved to be the only sure means of combating the weevil. Every suggested remedy has been tried and in every case negative results have been obtained. Cultural methods are summarized under five heads as follows:—

1. *Fall destruction.*—Cotton plants should be uprooted and burned as soon as the cotton is all harvested.

2. *Early planting of rapidly maturing varieties.*—This gives the cotton plants an opportunity to get well developed before the weevils become very abundant, and the injury is greatly lessened.

3. *Wide spacing.*—This favours rapid maturity of the plant, and acts as a remedial measure by allowing the sun to reach the ground and causing the drying up of the squares in which the larvae occur.

4. *Thorough cultivation.*

5. *Fertilization* with commercial preparations containing high percentage of phosphoric acid.

St. Lucia.

The following notes are extracted from a report by Mr. Ballou, on his recent visit to St. Lucia:—

The plants at the Botanic Station all seemed in good condition, none being sufficiently infested by scale or other insect pests to be noticeable. Mr. Buckmire informed me that a supply of the usual insecticides is kept on hand, and that the spraying apparatus which I had seen on previous visits was all in good order and frequently used.

At the Agricultural School, the gardens and nursery plots were carefully inspected and for the most part found to be in good condition. The cacao and Castilloa rubber were apparently growing vigorously except a few cacao plants which were smaller than others of the same age; no cause was, however, to be seen for this difference. These plants were quite free from pests, except one Castilloa plant which was badly attacked by the Akee fringed scale (*Asterolecanium pustulans*). I recommended that this plant be taken out and destroyed and that others on which a few of the scales appeared be sprayed.

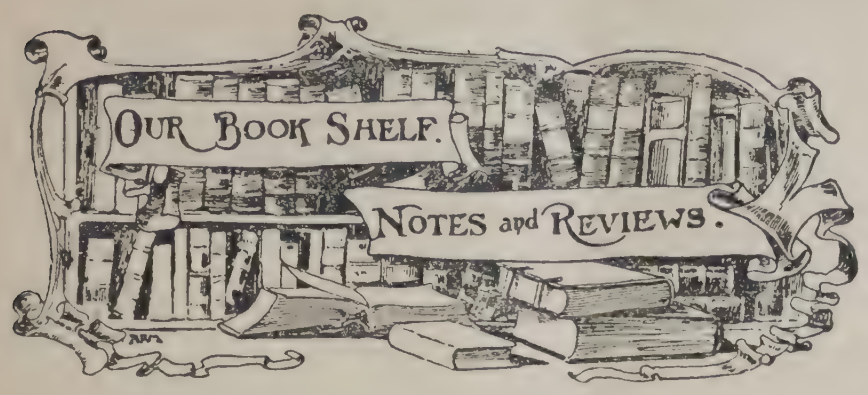
In the nurseries some of the small orange plants were somewhat infested with the West Indian red scale (*Aspidiotus articulatus*) and one of the shield scales (*Lecanium* sp.). It was recommended that these plants be sprayed.

Two plots of cotton, one of Upland and one of Sea Island, were very strong and healthy. On the plot of Upland cotton one cotton worm was found, and a few plants were attacked by plant lice. These latter will probably not prove serious, as there were a number of the red lady-birds (*Cycloneda sanguinea*) present. Careful watch will be kept for the appearance of the worms, and Paris green will be promptly used. The Sea Island cotton was especially vigorous in appearance. No worms or plant lice were to be seen infesting it. The leaf-blister mite was not seen on either of these plots, though careful search was made for it.

BRAZILIAN COFFEE.

The *Monthly Consular Reports* (United States) for March contains the following note:—

Careful investigation leads me to assume that the coming coffee crop (harvest of 1904-5) throughout the coffee States of Brazil will, from present indications, likely be below the average. It is of course impossible as yet to get reliable estimates, but there is no doubt that the coffee trees have suffered a great deal lately: first, probably on account of exhaustion, in consequence of consecutive abundant bearing; and, second, through very severe droughts that have prevailed for the last few months. There has consequently already been a considerable rise in the prices of coffee here as well as abroad; but this seems to be caused more by speculation than the natural condition of the market, as the visible supply in the United States, as well as in Europe, is large enough to satisfy a year's consumption without any further receipts. The present rise in prices will mostly benefit the dealers abroad who hold large stocks, the producers having already disposed of nearly all their holdings.



GUIDE TO CASTLETON GARDENS, JAMAICA: By Wm. Fawcett, B.Sc., F.L.S., Director of Public Gardens and Plantations. *Kingston, Jamaica, 1904.* Price 1*s.*

While this little handbook, as the title indicates, is written primarily for visitors to the delightful Castleton Gardens in Jamaica, it is one which students of economic botany are likely to find very useful on account of the 'Notes on the more interesting plants.'

The first twelve pages are devoted to a description of the gardens under the heading 'A walk round the gardens.' It is stated that in a single visit of short duration the visitor would be wise to follow the route suggested.

The following pages (13-61) are devoted to notes as to the economic uses, etc., of the most interesting plants.

Sixteen excellent plates from photographs illustrate this guide.

NOTES ON EGYPTIAN AGRICULTURE: Bulletin 62, Bureau of Plant Industry, United States Department of Agriculture. By George P. Foaden, B.Sc. *Washington, 1904.*

It will be remembered that the author of this bulletin visited the cotton-growing districts of the United States in May last year, and his report was published in the *Journal of the Khedivial Agricultural Society*, from which various extracts were published in the *Agricultural News.*

It is stated in the letter of transmittal accompanying this bulletin that, in view of the experiments that are being carried out in the United States with Egyptian cotton and other crops, it is of special importance to have a knowledge of the methods employed in Egypt. Special attention is therefore paid in this bulletin to such crops.

We publish an extract on onion cultivation in Egypt on p. 295 of this issue. We propose, later, to extract notes relating to Egyptian cotton culture.

Other important crops dealt with by Mr. Foaden are sugar-cane, berseem, alfalfa, rice, ground nuts, etc.

OVERZICHT VAN DE CULTUURGEWASSEN EN BOSCHPRODUCTEN IN DE KOLONIE SURINAME: By C. J. Hering. *Paramaribo: H. B. Heyde, 1903.*

This publication, which has been issued in six parts, running in all to about 300 pages, forms an excellent review of the cultivated plants of Surinam.

It is arranged as follows: part i, fibres; part ii, fats and oils; part iii, tannins, gums, and resins; part iv, dyes and colouring matters; part v, various useful plants of Surinam; part vi, non-indigenous plants that might be introduced and cultivated in Surinam.

In the first part considerable space is devoted to cotton. The different varieties are discussed, as also the cultivation of the cotton plant, ginning, baling, etc. Other fibre plants dealt with are the banana, plantain, Manila hemp, agaves, hibiscus, etc.

Among the oil plants we find the cocoa-nut, castor oil, ground nut, sesamum, croton, and others. Essential oils (e.g. citrus, musk okra, etc.) are also dealt with in this part.

In part iii there is an interesting and useful chapter on balata, which is an important article of export from Surinam. An account is also given of the various rubber trees in the colony, including Para, Hevea, Castilloa, etc.

Among the plants which it is suggested might be introduced are: Ramie, jute, cinnamon, clove, peppers, coca, pimento, cardamom, tobacco, etc.

As an appendix, this publication contains an interesting account of the economic palms of Surinam. It will therefore be seen that this is a work of a very useful nature for agriculturists and students of economic botany who are acquainted with the Dutch language.

DESTRUCTION OF RATS AND MICE.

In certain Departments of France rats and mice have committed such depredations on vines and growing crops that the losses arising therefrom have amounted to little less than a plague.

The Pasteur Institute now claims to have discovered a means of destroying these rodents with complete success and in a manner absolutely harmless to domestic animals.

In his report to the United States Government, which is published in the *Monthly Consular Reports* for May last, the Consul-General at Paris gives particulars of experiments carried out by Doctors Roux and Chamberland in certain rat-infested districts by distributing cultures of pathogenic bacteria.

The poison used was a preparation of microbes in a sort of soup (bouillon), into which quantities of wheat, oats, and small pieces of bread were dipped, becoming immediately impregnated with the microbes which the bouillon, or soup, contained. The wheat, bread, etc., so poisoned, were placed in and about the holes where the rats and mice were known to be.

To determine the effect of this poisoned paste, Dr. Roux had the fields that had been microbe treated ploughed up to see the condition of the rodents after they had eaten the paste and to fix approximately the number of rats and mice that had succumbed to the poison. In the result Dr. Roux estimated that he destroyed no less than 95 per cent. of the rodents—as many as fifteen to twenty dead rats were sometimes found in one hole. Further experiments were undertaken with equal success; and so satisfied are the anthorities with the results, that it is proposed to introduce into the Chamber of Deputies a Bill for the purpose of compelling farmers in rat-infested districts to co-operate in using this paste, the cost of which, including its application, is estimated at about 5 francs (96c.) per hectare (2·471 acres).

Birds, Fruits, and Insects. Reviewing a paper by J. B. Smith, the *Experiment Station Record* states: 'The economic relation of birds to fruit raising is briefly discussed. It is argued that no important fruit insect is controlled or even appreciably reduced in numbers by the agency of birds. The author believes, therefore, that the destruction of fruit by birds, especially robins, brings about a loss to the fruit grower which is quite out of proportion to the advantage gained by the presence of the birds. It is recommended, therefore, that in framing bird-protection laws the proviso should be inserted that these laws should not be construed to prevent farmers and fruit growers from killing birds which actually injure or destroy fruit, berries, or other farm crops.'

GLEANINGS.

The value of tomatos shipped from the Canary Islands during 1903 was £182,000, and that of potatos £30,886. (*Consular Report* for 1903.)

We learn with much pleasure that His Majesty the King has granted a charter of incorporation to the West India Committee.

The judges in the Prize Holdings Scheme in Jamaica report excellent results in the competition in the parish of St. Elizabeth. There were eighty-four entries.

The rainfall at Belize, British Honduras, during the year 1903, amounted to 70·90 inches. This was 10·58 inches below the average for the last twenty years.

At a meeting of the Antigua Agricultural and Commercial Society, held on August 5, it was stated that two lots of cotton shipped from the cotton factory had been sold at 16½*d.* per lb.

We learn that two experts are shortly to visit the West Indies on behalf of the British Cotton Growing Association for the purpose of reporting on the development of the cotton industry.

According to returns published in the *Annual Report* on Bermuda, the rainfall at the Prospect Camp Observatory amounted to 92·14 inches during the year, or 0·93 inches less than the average of the past nine years.

The yield of ground nuts in Egypt is about 55 bushels per acre. They are not generally manured. They are chiefly exported to Turkey. (*Bulletin* 62, Bureau of Plant Industry, U. S. Department of Agriculture.)

The *Chemist and Druggist* of July 30 contains a valuable article by Mr. C. J. Sawer, F.L.S., F.C.S., on 'Citronella and Lemongrass.' Special reference is made to essential oils from the West Indies.

The Acting Agricultural Instructor at St. Lucia reports that a planter is intending to take up pine-apple cultivation on a fairly large scale in that island. The black Antigua is the favourite variety in St. Lucia.

A committee of the Antigua Agricultural and Commercial Society has been appointed to inquire into and report upon the feasibility of introducing a system of irrigation into the island. It is stated that during the last seven months there have been only 13 inches of rain.

During the fortnight ended August 11, 136 bales of West Indian cotton were imported into the United Kingdom. The latest quotations are: West Indian, 4*d.* to 6·24*d.*; West Indian Sea Island, medium fine, 14*d.*; fine, 15*d.*; extra fine, 16*d.* per lb. (*West India Committee Circular.*)

Dr. J. E. Duerden, of the University of Michigan, formerly Curator of the Museum of the Jamaica Institute, is at present engaged in a study of living corals in the Hawaiian Islands under the auspices of the Carnegie Institution.

At the Agricultural School at Geisenheim (Germany) extra courses on the methodical use of fruit have been organized. They include: preparation of fruit wine, of vinegar, spirits, and sparkling wine, of fruit pastes, jellies, marmalades, preserves, and juices, and practical hints on the keeping and packing of fresh fruit. (*Consular Report* on trade of Frankfort.)

In reference to the notice in the *Agricultural News* (Vol. III, p. 238) inviting applications for the post of Curator of the Botanic Station in the Bahamas, we are asked to state that owing to a clerical error we were informed that the appointment would be for three years only; the duration of the Bill is five years.

A stock of plants was raised at the Royal Botanic Gardens, Kew, from kola seed believed to be *Cola vera* (with two cotyledons) obtained from Sierra Leone. A case containing forty plants has been sent to each of the Botanic Stations at Grenada, Dominica, St. Lucia, and St. Vincent.

The Grenada *Ferderalist* states that the excess shipment of cacao this season over last still holds good. Up to August 24, the colony had exported 3,439 bags more than at the corresponding period last year. The next season's crop also promises to be a good one, the trees being heavily laden with young pods.

Upon the suggestion of Sir Daniel Morris, Mr. F. V. Chalmers will probably visit Jamaica shortly to study the tobacco industry and advise the Board of Agriculture as to the best means of extending it. From samples of tobacco that have been submitted to him, Mr. Chalmers is of opinion that there are great possibilities for the tobacco industry in Jamaica if it is taken up on the right lines.

Writing from Dominica in reference to the note in the *Agricultural News* (Vol. III, p. 263) on bread-nut trees, Mr. R. Colthurst offers to supply the Imperial Commissioner of Agriculture with seeds of the seeded variety of the bread-fruit (*Artocarpus incisa*, var. *seminifera*). Curators of Botanic Stations are invited to apply to the Commissioner for a supply of these seeds.

The St. Thomas *Bulletin* states that Dr. P. Mortensen has received a very satisfactory report from the Vejle Cotton-spinning Company, of Denmark, upon a shipment of cotton grown by him from seed obtained from the Imperial Commissioner of Agriculture for the West Indies. According to the report the cotton was 'long, of excellent quality, and capable of being made to suit the highest purposes.'

ST. KITTS-NEVIS: REPORTS ON THE BOTANIC STATION AND AGRICULTURAL EDUCATION, 1903-4.

Botanic and Experiment Stations.—During the year the Curator, Mr. Wm. Lunt, died, and Mr. F. R. Shepherd was placed in temporary charge.

The total rainfall at the station during the year was only 39·54 inches, or 10 inches less than in the previous year. In consequence the station suffered very severely, and the experiments were considerably interfered with.

The sugar-cane experiments were continued at the central station at La Guerite and seven out-stations. Owing to the dry weather, the reaping was much delayed, and no crops were taken off during the year under review. The plots for reaping next year are all well established.

A branch station has been started at Nevis, where it is proposed to carry out experiments with various economic plants.

The new industries—cotton and onions—have been taken up in the presidency, and planters have ordered seed in considerable quantities through the station.

Agricultural Education.—The reports deal with the work of the Agricultural and Science Master. Mr. Belling's duties consisted in giving instruction in agriculture and the allied sciences at the Grammar School and in delivering lectures to elementary school teachers.

There were eight agricultural scholars at the school during the year. Attention was given to practical agriculture in the garden as well as to the school lessons. A large number of economic plants were grown, and instruction was given in budding, grafting, pruning, hybridizing, etc.

AGRICULTURE IN QUEENSLAND.

An interesting article on Queensland in the *Geographical Journal* for August contains the following reference to the economic products of the colony:—

Of the 360 kinds of Australian grasses, about three-fourths are met with in Queensland. Associated with these in their natural growth, is an esculent herbage of highly nutritious quality, and it is doubtless owing to the natural commingling of these diminutive forms of vegetation that the famous pastoral resources of the country are everywhere unsurpassed. Most of the grasses possess phenomenal vitality, and even when apparently annihilated by crushing droughts, they shoot forth luxuriantly after a shower of rain. The economic natural resources, although full of promise, have not yet been fully utilized. There has been little or no attempt to develop them effectively, and this is no doubt owing to the greater attention bestowed upon other more tempting industries. All kinds of tropical and extra-tropical fruits grow abundantly in the wild state and under cultivation. Vegetable oils of commerce are met with everywhere, and fibrous plants are numerous, many of the fibres manufactured from the latter being of excellent quality. About eighty varieties from the neighbourhood of Brisbane have been successfully treated by the late Mr. M'Pherson, who obtained the highest awards for them at international exhibitions in Australia and elsewhere. They are very fine in texture, and it would pay handsomely to establish an industry for their manufacture. There is a splendid opening in Queensland for the manufacture of vegetable oils, especially the essential oils of the *Eucalypti*, of which several varieties are met with. There are altogether about 360 known economic plants in the colony, of which some 130 have been introduced.

Tobacco grows to perfection in the Stanthrope and Killarney districts, and it is locally manufactured to some extent, the quality and flavour of the weed being greatly appreciated by consumers. Coffee is cultivated in the northern district, east of the main range, where the soil and the climate are especially favourable to the growth of the plant. Cotton and arrowroot find congenial fields in the rich lands of the southern district, on the eastern side of the main range. Fruit growing is an industry that has hitherto received very little attention, but for the extension of which there is great scope.

FORESTRY IN HONGKONG.

The following extract from the *Report on the Botanical and Afforestation Department* of Hongkong is of particular interest as showing the value of a systematic policy in the matter of re-afforestation:—

The time has now arrived for the colony to profit to the full extent by the foresight of the Government of a former generation.

In the late seventies tree planting was seriously undertaken, and from the year 1882 to 1885 the annual expenditure of $12,000 was expressly sanctioned for afforestation, and from 200,000 to 300,000 young pines were planted each year. As the island became more completely covered with plantations, the operations and annual votes gradually diminished, until the present time, when the planting of a few thousand trees can be covered by a small portion of the tree-planting vote of $3,450. As a result of this policy there are now nearly 5,000 acres of pine upon the island, and the oldest plantations, now between twenty and thirty years old, are ready to fell and replant.

The pine plantations are of very various ages and sizes and much time has been devoted during the year to a careful examination of them and subsequently to delineating them on maps and schedules so that a systematic working plan can be drawn up to ensure as far as possible a uniform annual outturn of timber. The surface of the island has been divided for this purpose into seven main divisions, and each of these into six to eight blocks containing from 50 to 300 acres of pine plantations each. The primary object of this preliminary inspection of the plantations was to obtain statistics upon which to found a working plan for the future, but the results have a further interest as showing what return the Government have for their outlay of former years.

DEPARTMENT NEWS.

Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist and Agricultural Lecturer on the staff of the Imperial Department of Agriculture, left Barbados in S.S. 'Dahomé' on Tuesday, September 6, for St. Lucia and Dominica, for the purpose of inspecting the Agricultural Schools in those islands. Mr. Lewton-Brain was expected to return to Barbados to-day.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following is Mr. J. R. Jackson's report for the month of July:—

We can best sum up the state of the markets in the word 'inactive.'

GINGER.

Little or nothing was done until the 20th. of the month, when a moderate supply of Jamaica was offered, a small part being sold at 36*s.* for middling and 32*s.* to 34*s.* for ordinary dull; 97 bags of Cochin were also disposed of at the same time at 18*s.* 6*d.* to 19*s.* for washed rough, and 19*s.* 6*d.* for brown rough. A week later 345 barrels of Jamaica were offered and bought in, including fair washed, at 40*s.* to 43*s.* Some 900 packages of Cochin and Calicut were catalogued, only 30 finding buyers at late rates. Forty-three bags of Japan were offered at this sale and sold at 17*s.* for limed, slightly mouldy.

NUTMEGS AND MACE.

Of nutmegs, at the first sale of the month on July 6, 48 packages of West Indian were offered and sold at the following rates: 73's at 1*s.* 3*d.*; 79's at 1*s.* 1*d.*; 86's at 11*d.*; 94's to 95's at 9*d.* to 10*d.*; 98's to 102's at 8*d.* Steady rates were maintained a week later and continued to the close of the month.

Mace at the first sale was represented by 3 packages of West Indian fair pale and reddish, which sold at 1*s.* 5*d.* No quotations were made at later sales.

ARROWROOT.

Of arrowroot little or nothing has to be reported. At the sale on the 6th. no other offerings were made beyond 700 barrels of St. Vincent, which were bought in. A week later no St. Vincent was offered, Natal only appearing, and this was bought in.

SARSAPARILLA.

At the drug auction on the 7th., native Jamaica was sold at from 7*d.* to 9*d.* per ℔. for yellowish to fair red; good Jamaica found no buyers and good Guayaquil was bought in at 1*s.* per. ℔. A fortnight later a moderate supply of grey and native Jamaica was shown, 31 bales of the former were sold at prices from 11*d.* to 1*s.* per ℔. for sound, and 10½*d.* to 11*d.* for sea damaged; 10*d.* per ℔. was realized for 1 bale of fair pale red; 9*d.* per ℔. being asked for 8 bales of dull medium red.

PIMENTO, LIME JUICE, TAMARINDS, ETC.

Nothing remarkable occurred in dealings with pimento until the sale on the 13th., when between 400 and 500 bags were disposed of at better prices than had previously prevailed, fair berries fetching 4⅛*d.* to 4¼*d.*, and good 4¼*d.* to 4½*d.* per ℔. At the last sale, on the 26th., the quotations generally were lower; 90 bags were sold without reserve at 2⅞*d.* to 3*d.* per ℔.

Lime juice was in good demand at the beginning of the month, the prices standing thus: Good West Indian raw, 1*s.* 3*d.* to 1*s.* 4*d.*; and refined, 1*s.* 7*d.* to 1*s.* 8*d.* At the later sale, on the 13th., the prices were very slightly advanced, but there was a much larger demand in consequence of the hot weather.

On the 6th., 11 barrels of fair West Indian tamarinds were sold at 6*s.* 6*d.* per cwt., good West Indian being bought in at 10*s.* The total quantity offered was 211 barrels. At a later sale 112 packages, mostly Barbados, were brought in at 9*s.* per cwt. in bond.

Of 19 bags of West Indian kola, 2 were sold at 5¾*d.* for good bright, while small shrivelled West Indian washed realized 4*d.* to 4½*d.*

Canada.

Mr. J. Russell Murray has forwarded the following report on the trade in West Indian products in Canada during the month of July:—

The general tone of inquiries for present and future business is very satisfactory.

Sugar.—The strong market that continues for all grades of sugar shows no sign of weakening, and to-day's quotation of 10*s.* 1½*d.* for August delivery of beets is the highest seen for a considerable time. Arrivals of 96° crystals continue, but there is not likely to be much new buying on this market for refining purposes for several weeks yet. Stocks of crystals and muscovados are considerable. Sales of crystals at $2·55, c. & f., have taken place for small lots, but for large lots there is no quotation beyond the usual parity of New York or London prices. The stocks of muscovados in refiners' hands both here and in the Maritime provinces are very heavy, and present offers are difficult to place. The seasons' opportunity for grocery sugars is near, as the fruit preserving will be active in a few weeks hence.

The May report of the Department of Trade and Commerce has just been issued, and the following figures indicate the growth of the West India sugar trade in Canada:—

	1903.	1904.
Great Britain	$ 384	$ 27,431
United States	4,305	8,901
Belgium	58,990	—
British Guiana	—	302,583
British West Indies	179,806	706,657
Germany	6,264	7,203
Other countries	66,302	194,724
	$ 316,051	$ 1,247,499

The arrivals of sugar at Montreal during July according to latest information are:—

S. S. 'Yaruba,' 27,700 bags; S. S. 'Yanariva,' 36,000 bags; S. S. 'Indianapolis,' 23,450 bags.

Molasses.—The market continues without much movement among buyers, while prices locally have been advanced, and every prospect is good for holders. The principal buying seems to have been in Nova Scotia and New Brunswick. Arrivals of Barbados molasses in Montreal during the month amounted to only 1,110 puncheons, 140 tierces, and a few barrels.

Cocoa-nuts.—Prices in New York have recovered considerably, but the fall and rise have not been reflected here to the same extent, and prices remain very steady. Imports being for immediate consumption, there has been no surplus or shortage of stocks on the market.

Fruit.—Demand for bananas has been very heavy and large supplies have been received.

The market for limes is flooded and great difficulty is being experienced in effecting sales. The weather has not been warm enough to stimulate the consumption.

As soon as possible shipments of oranges should be made. While boxes are very desirable, barrels sell equally well. Grade the fruit to three sizes: it will improve the price at least 10 per cent.

MARKET REPORTS.

London,—August 16, 1904. Messrs. J. Hales Caird & Co., Messrs. Kearton, Piper & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular, August 12; and 'The Public Ledger,' August 13, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* per lb.
Balata—Block, 1/3 to 1/3½ per lb.
Bees'-wax—£7 2*s.* 6*d.* to £7 12*s.* 6*d.* per cwt.
Cacao—Trinidad, 58/- to 62/- per cwt.; Grenada, 53/- to 57/6 per cwt.; Dominica, 49/6 to 57/6 per cwt.; Jamaica, 51/- to 56/- per cwt.
Cardamoms—Mysore, 7½*d.* to 2/- per lb.
Coffee—Jamaica, good ordinary, 38/- per cwt.
Cotton—West Indian Sea Island, medium fine, 14*d.*; fine, 15*d.*; extra fine, 16*d.* per lb.
Fruit—
Bananas—Jamaica, 5/6 to 7/- per bunch.
Grape Fruit—Jamaica, 10/- to 11/- per case.
Oranges—Jamaica, 10/- to 14/- per case.
Pine-apples—Antigua, 12/- per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Fair to good bright, 40/- to 47/-; lean and dark, 29/- to 30/- per cwt.
Honey—15/- to 18/6 per cwt.
Isinglass—West Indian lump, 2/6 to 2/10; cake, 1/2 to 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 1/2 to 1/5 per gallon; concentrated, £14 per cask of 108 gallons.
Lime Oil—Distilled, 1/6 to 1/7 per lb.; handpressed, 2/9 to 3/- per lb.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Fair to good pale, 1/6 to 1/10; red, 1/2 to 1/5; broken, 11*d.* to 1/- per lb.
Nitrate of Soda—Agricultural, £10 5*s.* per ton.
Nutmegs—63's, 1/10; 86's, 1/-; 103's, 8½*d.*; 150's, 5*d.* per lb.
Pimento—3*d.* per lb.
Rum—Demerara, 7*d.* to 7½*d.* per proof gallon; Jamaica, 1*s.* 9*d.* to 1*s* 9½*d.* per proof gallon.
Sarsaparilla—No quotations.
Sugar—Crystallized, 16/- to 17/3 per cwt.; Muscovado, Barbados, 13/3 to 14/- per cwt.; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£11 17*s.* 6*d.* to £11 18*s.* 9*d.* per ton.

Montreal,—August 8, 1904.—Mr. J. Russell Murray. (In bond quotations.)

Bananas—Jamaica, 85c. to $1·00 per bunch of 8 hands; $1·15 to $1·25 per bunch firsts; $1·50 per bunch Jumbos, c. & f.
Cedar—Trinidad, 40c. per cubic foot, c. & f.
Cocoa-nuts—Jamaica, $25·00 to $27·00; Trinidad, $21·00 to $24·00 per M., c. & f.
Coffee—Jamaica, medium, 8½c. to 9½c. per lb., c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb., c. & f.
Limes—Jamaica, $4·00 per barrel, c. & f.
Molascuit—Demerara, $1·32 per 100 lb., c. & f.
Molasses—Barbados, 24c. to 26c.; Antigua, 20c. to 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 17c. to 18c. per lb., c. & f.
Pimento—Jamaica, 7¼c. to 7½c. per lb., c. & f.
Pine-apples—Cubans, crates 36's to 18's, $3·75 to $4·10.
Sugar—Grey Crystals, 96°, $2·55 to $2·60 per 100 lb., c. & f.
—Centrifugals, 89°, $2·25 to $2·30 per 100 lb., c. & f.
—Molasses, 89°, $2·10 per 100 lb., c. & f.
—Barbados, 89°, $2·35 per 100 lb., c. &. f.

New York,—August 19, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¼c. to 13c.; Jamaica, 9¾c. to 11½c.; Grenada, 12c. to 12½c.; Trinidad, 12c. to 13c. per lb.
Cocoa-nuts—Trinidads, $25 to $27 per M., selected; Jamaicas—$30·00 per M.
Coffee—Jamaica, fair to good ordinary, 8½c. per lb.
Ginger—Jamaica, 7c. to 8c. per lb.
Goat Skins—Jamaicas, 52c. to 54½c. per lb.
Pimento—4⅞c. per lb., spot quotation.
Sugar—Centrifugals, 96°, 4¼c.; Muscovados, 89°, 3 11/16c. to 3¾c.; Molasses, 89°, 3 7/16c. to 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—August 27, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·50 to $3·60 per 100 lb.
Cacao—Dominica, $13·50 per 100 lb.
Cocoa-nuts—$13·50 per M. for husked nuts.
Coffee—Jamaica, $10·00 to $11·00; ordinary Rio, $11·00 per 100 lb.
Hay—$1·20 per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
Molasses—Market closed.
Onions—Madeira (stringed), $1·16 to $1·50 per 100 lb.;
Potatos, English—$2·65 per 160 lb.
Rice—Ballam, $4·50 to $4·60 per bag (190 lb.); Patna, $3·40 per 100 lb.
Sugar—Market closed.

British Guiana,—August 25, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $8·00 per barrel.
Balata—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 13c. to 13½c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—$4·25 to $4·40 per bag of 168 lb.
Eddoes—60c. per barrel.
Molasses—Vacuum Pan yellow, 15½c. per gallon (casks included).
Onions—Madeira, $1·60 to $1·90 per 100 lb.; Teneriffe, 1½c. per lb.
Pea Nuts—American, 6½c. to 7c. per lb. (retail).
Plantains—24c. to 40c. per bunch.
Potatos, English—Teneriffe and Madeira, $1·80 per 120 lb. (retail).
Rice—Ballam, $4·40 to $4·50; Creole, $4·50 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·20 per barrel, $1·08 per bag.
Tannias—$1·08 per barrel.
Yams—White, $2·16 per bag.
Sugar—Dark Crystals, $2·40 to $2·50; Yellow, $2·60 to $2·80; White, $3·50 to $3·75; Molasses, $2·00 to $2·25 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—August 25, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary, $12·30 to $12·40; Estates, $12·50 to $12·75; Venezuelan, $12·75 to $13·10 per fanega (110 lb.).
Cocoa-nuts—$19·00 per M., f.o.b.
Cocoa-nut Oil—73c. per Imperial gallon (casks included).
Coffee—Venezuelan, 6½c. per lb.
Copra—$2·70 per 100 lb.
Onions—$1·20 to $1·25 per 100 lb.
Potatos, English—$1·20 to $1·45 per 100 lb.
Rice—Yellow, $4·20 to $4·50; White Table, $4·80 to $5·50 per bag.

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'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the Cotton-growing districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 64. BARBADOS, SEPTEMBER 24, 1904. PRICE 1*d.*

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The Cacao Industry in the West Indies.

ONE of the articles in the new issue of the *West Indian Bulletin* (Vol. V, no. 2) deals with the cacao industry in these islands. It shows clearly that a very substantial progress has been made in recent years: almost every cacao-producing country in the world has of late been increasing its output, and the British West Indies have shared in this increase to no small extent. Taking the last five years, the increase in output from these islands has been something like 50 per cent.—from 337,431 cwt. in 1898 to 495,653 cwt. in 1902.

The industry has grown to such an extent, especially in some of the islands, that cacao occupies a very important place in the list of exports. Thus, the value of the cacao annually exported from Trinidad now exceeds £1,000,000, while from Grenada £250,000 worth is exported. Though Trinidad and Grenada are the two most important producers of cacao in the West Indies, there is a continually increasing export from Jamaica, which reached the value of £84,000 in 1901-2, while in 1900 the exports of cacao from St. Lucia formed 17 per cent. of the total exports of the island. Considerable quantities of cacao are also shipped from Dominica, St. Vincent, and British Guiana, while Montserrat and St. Kitt's-Nevis also produce small amounts.

With regard to the quality of the cacao shipped from the West Indies, that from Trinidad fetches the best price, the bean being said to be 'the finest and best flavoured.' The London prices vary from 65*s.* to 80*s.* per cwt. Grenada cacao, although it does not obtain quite as high a price, has a good and regular flavour, and the crop is 'eagerly bought up in British

and American markets.' Other cacaos from the West Indies—those from Jamaica, Dominica, and St. Lucia—are generally classed together in the market reports. During the present year these have been selling at 50*s.* to 61*s.* 6*d.* It is an interesting feature of the small export of cacao from British Guiana that it obtains such a good price (during the present year this has been between 64*s.* and 65*s.*) as to place it, in quality, second only to that of Trinidad; yet strange to say, if we may judge from the exports, very little interest appears to have been taken in the cultivation of this product.

Of all cacao-producing islands in the West Indies, St. Vincent is the only one unable to show a decided advance. This, of course, is due to the hurricane of 1898. In 1897 the exports of cacao were of the value of £4,514; two years later they were worth only £116. We are glad to observe that this important industry has, to some extent, been resuscitated, and in 1902, 780 cwt., of the value of £1,558, were exported. Further, it is evident from the number of plants that have been distributed from the Botanic Station that cacao is being somewhat extensively planted in the island.

The output of cacao from these islands has, then, considerably increased during the last few years. This increase has not been confined to one or two islands, but has been participated in, not only by Trinidad and Grenada, but also by Jamaica, St. Lucia, and Dominica. Further, there are many indications that in the ordinary course of events this increase will be maintained. The planting of cacao has received much encouragement from the Imperial Department of Agriculture, and in all the islands mentioned there are evidences that the acreage in cacao has been considerably extended. The best indication that much attention has been given to the planting of cacao is to be found in the large distribution of cacao plants from the various botanical establishments in the West Indies. It will be seen that these institutions have been no small factor in the extension of the cacao industry. From four of the Botanic Stations nearly 30,000 cacao plants, in addition to over 17,000 pods, were distributed in the year 1903-4. In Jamaica, during the last four or five years, the number of cacao plants distributed from Hope Gardens has been nearly 50,000 per annum.

The outlook for this industry is decidedly promising; for, although the world's production has been very considerably increased, the fact that the total consumption has also increased would seem to indicate that, for the present at any rate, there need be no fear of a material fall in prices. It is necessary, however, that growers should make every effort to place on the market only the best quality of cacao. To secure this, careful attention must be paid to the curing and drying. Should there be a serious fall in prices, it will be chiefly the lower-grade cacaos that will be affected.

SUGAR INDUSTRY.

The Use of Jamaica Sugars for Preserves.

Mr. H. H. Cousins, M.A., F.C.S., reports as follows in the *Bulletin of the Department of Agriculture*, Jamaica, on the results of an investigation into the use of native sugars in the making of preserves:—

Brown and white vacuum-pan sugars were obtained from merchants and sugar planters, as follows:—

Estate.	Description.	Polarization. Per cent.
Belleisle	White	98·9
do.	Brown	98·2
Caymanas	White	99·0
do.	'Yellow Demerara'	96·9
Per Messrs. Myers	White	98·6
Per Messrs. Wray & Nephew	Brown	96·1
Cinnamon Hill	Brown	98·6
do.	Fair	99·8
Serge Island	Brown	98·4
Worthy Park	Brown	99·3

These data are very creditable to our Jamaica sugars. The sugars from Cinnamon Hill and Worthy Park were of unusual purity and nearly chemical sucrose. Some of the other sugars were somewhat damp and moist. We have, regularly produced in the island, a supply of sugars well fitted for preserving if properly sterilized. We found, however, that all the sugars were more or less infected with a species of *Torula* with a powerful fermentive action. All these sugars rapidly developed this organism when introduced into sterile nutritive media, even in the proportion of equal parts sugar and medium. This shows that unless perfectly sterilized, the native sugars could not successfully be used for preserving in the usual proportion of half sugar to half fruit.

EXPERIMENTS IN STERILIZATION AND WITH PRESERVATIVES.

Neither boric acid nor formaldehyde, within the limits at all permissible in a food product, were effective in preserving fruit pulp. Sulphur dioxide, however, proved strikingly effective, and it was decided to select this preservative as the best and least harmful agent for preserving fruit pulp and jams.

Provided sterile conditions could be maintained in the containing vessels, steaming proved completely effective in preserving both pulps and jams made with native sugar.

It was found, however, under commercial conditions of packing, that marmalades made with native sugars fermented. By adding ½ per cent. calcium bisulphite solution, of specific gravity 1·068, all marmalades made with Jamaica sugars have kept perfectly. The preservative is harmless and was not found to affect the flavour of the marmalade.

Mango Jams.—A number of mango jams made with the native sugars, before and after treatment with sulphur fumes, have kept to date—six weeks. No difference can yet be seen between the treated and untreated jams. A longer trial is necessary before any conclusion can be drawn.

Pine Slices in Syrup.—A trade to the United States in cut slices of pine packed in barrels in a secret preservative liquid (? salicylic acid) flourished for a while, but has, I understand, been destroyed by the prohibiton of the preservative by the United States Government. Our experiments indicated that a ½ per cent. solution of calcium bisulphite was an efficient preservative for raw sliced pines with or without native sugar in the form of syrup. It is hoped that this trade may be resuscitated, as bisulphite could not be prohibited as dangerous to health.

CONCLUSIONS.

Our best native sugars are of high quality, but are all infected with the fermentive *Torula*, and special treatment is required to ensure a sterile preserve.

Sulphur dioxide and calcium bisulphite appear to be the best chemical preservatives for fruit pulp, fruits in syrups and jams made with native sugars.

Sugar-cane Experiments in British Guiana.

The following is the concluding portion of Professor Harrison's report on the results of experiments with varieties of sugar-cane in British Guiana:—

MILLING QUALITIES OF THE VARIETIES.

The opinions as to the milling qualities of the varieties are now fairly concordant. D. 625 is reported by all as 'fair'; D. 145 in all cases as 'bad'; D. 109 as 'good'; B. 147 as 'fair'; D. 74 as 'good'; Bourbon as 'good'; White Transparent is described as 'bad,' as 'fair' and as 'good,' and D. 78 in all cases as 'bad.'

QUALITIES OF THE MEGASS AS FUEL.

Wide differences of opinion are recorded with regard to this. As a rule the megass of D. 625 is described as 'good,' but one experimenter terms it 'poor,' and another finds it 'very bad'; that of Sealy is described as 'good'; the megass of D. 95 is 'fair'; that of D. 145, 'fair,' 'bad,' and 'very bad'; that of D. 109 is termed 'poor,' 'fair,' and 'good'; the megass of B. 147 is usually described as 'fair,' but some have found it 'very bad'; that of the Bourbon is of course 'good,' or even 'excellent'; D. 74 has yielded 'poor' and 'bad' megass; while that of the White Transparent is in one case termed 'good,' in all other cases 'poor,' 'bad,' or 'very bad,'; and D. 78 is characterized as 'fair,' as 'bad,' or more usually as 'very bad.'

It is not advisable to draw any wide-reaching deductions from these experiments. They, however, indicate that several varieties of sugar-canes can be relied upon in British Guiana to give yields of sugar in quantities equal to or greater than those obtained from the Bourbon, and that several varieties—for instance, D. 625, D. 145, and D. 109—possess well-marked ratooning qualities. D. 625 and D. 109 can be safely recommended to cane farmers for trial, the former on relatively heavy lands, the latter on lighter soils.

Certain varieties—D. 74, the White Transparent, and especially D. 78—show signs of falling off in their yields, and the committee feel that as a general rule further extensions of their cultivation cannot be recommended.

Under factory conditions the marked differences in the saccharine strength of the expressed juice of the canes, so very noticeable in small-plot experiments, tend to disappear. The following shows the calculated expression of the juices, their contents of saccharose in pounds per gallon, their quotients of purity, and their quotients of non-sugars:—

Variety.	Extraction.	Saccharose in pounds per gallon.	Quotient of purity.	Quotient of non-sugars.
D. 625	77·5	1·423	81·3	9·6
D. 109	61·2	1·471	80·7	12·1
B. 147	77·1	1·485	82·4	10·1
D. 95	56·9	1·433	80·8	14·3
D. 145	69·5	1·506	82·4	10·5
Bourbon	70·3	1·453	80·6	12·7
Sealy	74·8	1·467	79·9	12·0
White Transparent	57·0	1·449	81·5	11·6
D. 78	63·4	1·395	78·2	14·4
D. 74	61·3	1·474	80·7	14·6

The means of the contents of saccharose in pounds per gallon, of the quotients of purity, of the quotients of non-sugars and of the recovery of commercial sugars per cent. of indicated sugar in the juices of the varieties during 1901-3 are as follows:—

Variety.	Saccharose.	Purity.	Non-sugars.	Glucose ratio.	Recovery.
D. 625	1·334	79·4	12·6	9·8	84·6
Sealy	1·435	81·2	12·1	7·5	84·5
D. 95	1·480	83·1	11·7	5·9	82·1
D. 145	1·444	82·0	11·1	9·2	84·3
D. 109	1·390	83·2	9·9	7·7	82·0
B. 147	1·376	79·8	13·6	8·0	83·5
Bourbon ...	1·480	82·5	11·1	7·2	82·5
D. 74	1·450	81·9	12·6	6·2	83·9
WhiteTransparent	1·433	83·2	8·9	7·1	85·0
D. 78	1·305	77·8	15·9	8·9	83·1

In considering these results it must be borne in mind that in the cases of many of the experiments the varieties of sugar-cane have been grown on land on which the latter cane does not flourish, while the Bourbon returns are, as a rule, from land of average quality.

Sisal Hemp at New Orleans. The following table, states the *Consular Report* for 1903, shows how rapid has been the increase in the imports of sisal hemp from Mexico into New Orleans:—

1900	1,466 tons,	valued at	£37,281.
1901	14,069 „	„ „	£326,314.
1902	23,365 „	„ „	£644,957.
1903	31,424 „	„ „	£827,122.

WEST INDIAN FRUIT.

THE CITROMETER.

At a meeting of the Dominica Agricultural Society, held on August 12, the Hon. Francis Watts addressed the meeting as follows on the subject of the citrometer, a special form of hydrometer for testing lemon and lime juice:—

The origin of the scale of the citrometer was unknown, and he believed he had rediscovered it, for he found that when the indications of the citrometer were taken in boiling concentrated lime juice they were found to approximate closely to the indications of a Twaddell's hydrometer at 60° F. Thus, a sample of lime juice giving a reading of 60° citrometer at boiling temperature will give a reading of 60° Twaddell at 60° F. As a result of the discovery, the planters will now be able to concentrate their lime juice with some degree of scientific accuracy.

MARKETING FRUIT.

In an able article in the Natal *Agricultural Journal* on 'Fruit culture as a Natal Industry,' the writer makes the following observations on the marketing of fruit:—

No fruit, except the lowest qualities, should be marketed in rough bulk. All others should be graded to size, colour, form, and maturity, and packed so that they can be sold in the case.

The fruit must arrive at its destination before it is fully mature, and still sufficiently free from bruises to allow it to ripen equally and thoroughly. It is in being able to judge, or to know from past experience, the exact condition in which each fruit must be picked in order to arrive fit, that the skilled grower and packer scores, while the amateur keeps on losing money while he learns.

Regular senders of highest grades soon become known, and then constantly command a market. Their brands become widely recognized, the constant quality is a standing advertisement. But this condition is attained only by adhering rigidly to the principle of sending away no second grades; indeed such should not be grown, but if they are grown make cider or marmalade of them rather than ruin a good name by marketing this class. It is not in the fruit alone that this care is necessary, but in every detail connected with each consignment, the grading, the quality, the maturity, the colour, the cases, the packing, the despatch, the cartage, the ventilated car, the cool chamber (if necessary)—in fact, every detail, however small, which can make or mar the success of a business.

THE BANANA INDUSTRY IN THE UNITED STATES.

The following account of the banana industry in the United States is taken from the *Consular Report* on the trade of Philadelphia for 1903:—

During the last fifteen years the trade in bananas has grown to an enormous extent in the United States of America. In 1902 there are reported to have been 50,000,000 bunches of bananas brought into the United States, while from ten to fifteen years ago the fruit was practically unknown here.

Cuba was the first country to send bananas to the United States; the Spanish-American war, however, prevented the proper development of the crops, and finally the trade with that island ceased altogether. Jamaica, in the meantime, has substituted its banana crops for those of Cuba, and up to the time of the hurricane last year a large proportion of the bananas imported to the United States came from that island. The hurricane destroyed a large number of the plantations, and it will not be until next autumn that they will be again in operation.

Of late great development has taken place in the banana trade of Central and South America, and a considerable portion of the supplies now received come from those districts. Another producer is Porto Rico, and many consumers think that its fruit is superior to any other, and the prices therefore range higher for the fruit from that island.

The banana business has now been reduced to a science. Formerly shipments were made on sailing schooners, and in consequence large portions of the cargoes were always found to be spoiled, but of late this trade has been carried on with fine steamers fitted with refrigerating apparatus. Most of the fruit is consigned direct to the dealers, but occasionally a cargo arrives in port here, which is sold by auction.

AGRICULTURE IN ST. LUCIA.

In the St. Lucia *Blue Book* for 1903, the following remarks occur under the heading 'Improvements in Agriculture and Manufactures':—

The cultivation of limes has been taken up on a small scale.

Manioc cultivation and preparation for the export of starch is in the experimental stage.

Cacao plantations are gradually being extended, and methods of cultivation improved.

Cotton growing is slowly on the increase, the area under this crop being about 250 acres.

COTTON INDUSTRY.

West Indian Cotton in England.

The *West India Committee Circular* has the following interesting note on the position of West Indian cotton on the English markets:—

We learn from Mr. Wolstenholme, Vice-chairman of the West Indies section of the British Cotton-growing Association, that, after remaining steady for several months, the market for Florida and Georgia Sea Island cotton in Savannah has declined 1*d.* per lb. A stock of about 8,000 bales has been held there for extreme prices, and owing to the near approach of the new crop, which will come forward in September, holders are pushing sales. In consequence, all the lower qualities of West Indian Sea Island, which compete with Floridas and Georgias, have fallen in value to a similar extent. The very best, which compares with Carolina Sea Island, of which there is no stock, commands full rates. For Florida, which was recently worth 15*d.* to 16*d.* per lb., the new crop is expected to open at about 13*d.*, which was last season's opening price.

Cotton in Paraguay.

The following note on the prospects of cotton cultivation in Paraguay is taken from the *Consular Report* for 1903:—

Cotton has been cultivated in Paraguay for many years, but hitherto little or no attempt has been made to export it. In the past year, however, considerable interest has been manifested in this product by cotton dealers and experts who have visited the country. Samples forwarded to the United Kingdom have met with considerable approval, and one shipment to Manchester was pronounced 'very good standard quality.' Paraguayan cotton is said to resemble the Egyptian variety. A shipment of 12 bales has been sold by two different firms in London, the opinion expressed by the buyers being favourable, and to the effect that the cotton was clean, lustrous, and free from seeds or leaves, and should be able to compete with United States cotton. Besides the white variety, there is also a coloured cotton growing in this country which is stated to command a good price in Europe. The prices obtained for these cottons in Europe were 5*d.* per lb. for the white and 6*d.* for the red.

Cotton Cultivation in British Guiana.

At a meeting of the British Guiana Board of Agriculture held on August 26, Professor Harrison made the following interesting statement with regard to cotton experiments in the colony:—

Since the Board's last meeting he had visited the majority of places in the colony where cotton was being cultivated, and the result had pointed fairly conclusively to the fact that the cultivation of Sea Island cotton on heavy clay soil was absolutely waste of men's time and money. On the lightest soil, like the soil of Bush Lot, satisfactory crops were being obtained, and if the experimenter had known more of agriculture he would have had not only a satisfactory crop but a heavy one. In going from place to place he saw a great variety of soils and in that way obtained indications with regard to the cultivation of Sea Island cotton. The experiments at Windsor Forest were very interesting. The variety there, which had been sold as Egyptian, seemed to be very promising so far as growth was concerned, but how it promised commercially he did not know.

Cotton Growing in the Gold Coast Colony.

Mr. Edward Fisher visited the Gold Coast in the interests of the British Cotton-growing Association in June last year to report on the prospects of establishing a cotton-growing industry in the colony. His report is published in the *Report of the Botanical and Agricultural Department* for 1903. The following is a summary of his views:—

Cotton will grow well in most of the districts visited, provided it receives proper care and attention.

Labour-saving implements should be introduced, and the natives taught the use of them.

Convenient markets should be provided in all cotton-growing districts.

The producer should be paid the highest possible price for his raw cotton, even if the buyers have to abstain from making any profit at present.

Until the stock and transport problem is settled, it will not pay to open up large plantations for the growing of cotton alone under European management.

Native cotton receiving the same care and attention as is given to cotton grown from American seed would compare favourably with the latter, and being acclimatized is less liable to injury, although at present its yield is smaller.

Insects are at present very injurious.

Seed Selection.

The following note on the importance of selecting good cotton seed is extracted from *Bulletin* 62, Bureau of Plant Industry, United States Department of Agriculture, 'Notes on Egyptian Agriculture':—

The question of the selection of seed for sowing is occupying considerable attention in Egypt, as Afifi cotton, which is the mainstay of the crop, is greatly deteriorating. Owing to the great similarity not only of the plants of the different varieties grown in the country but also of their seeds, the matter is a somewhat difficult one. At the present time the question of seed is entirely in the hands of the cotton merchants. When the best qualities of cotton of the first picking are being ginned, the factory owner places on one side the resulting seed for disposal to his clients the following season. This is excellent as far as it goes, but where two or three varieties are being dealt with in a factory, even though the proprietor may clean his gins, his riddles, etc., after each ginning, a certain admixture must take place. The seedsman class is quite wanting in Egypt, and until recently most of the cultivators were not sufficiently alive to the question of good seed. At the present time, however, the Khedivial Agricultural Society is paying special attention to this most important subject, while individual cultivators appreciate more the necessity of employing good and pure seed.

Small cultivators in the past obtained their seed to a great extent through the village money-lender, who supplied them with ordinary commercial seed quite unsuited for sowing purposes. The Khedivial Agricultural Society now distributes seed of first-picking cotton to small growers at cost price. The value of the seed, plus a moderate rate of interest, is collected by the Government agents when the ordinary taxes are collected. The seed is not paid for until the resulting cotton crop is picked. The benefits are two-fold, not only is the fellah provided with better seed than he would obtain elsewhere, but he is to a certain extent kept out of the hands of the usurer. The question of the establishment of seed areas is now under consideration.

MANUFACTURE OF PANAMA HATS.

The following interesting account of the manufacture of Panama hats from *Carludovica palmata* is taken from the United States *Monthly Consular Reports* for April :—

These hats are made from the common fan-shaped palm, called 'Palmicha,' which grows wild in abundance, generally in moderate climate and fairly moist ground. Young shoots, uniform in size, are cut from the plant and boiled to a certain stage, being softened thereby and brought to a light-yellow colour. The process of boiling appears to be an art in itself, and only a few people can turn out good straw. The boilers sell the straw at so much a pound, according to quality and the prevailing prices of hats.

Fig. 12. Carludovica palmata.
[From *Dictionary of Gardening.*]

When the proper boiling point is reached the shoots are put up to dry and the leaves quickly separated. This is done indoors, where there is a current of air, but no sunshine. When the leaves are nearly dry, they are split with a little Y-shaped instrument of wood, so that every good leaf is the same size. When left alone to dry the leaves curl in at the edges and are then ready for use, and at this point the straw is carefully wrapped in clean cloths, as the light and dry atmosphere spoils it. When finished the straw is carefully pared with a pocket-knife and then battered all over with a small hand maul, after which it is washed with common yellow soap and a little lime juice and left to dry, away from the sunlight.

The hats made in Suaza district in Colombia are considered much superior to those made in Ecuador.

The manufacture of these hats is affected, to a great degree, by climatic influences, an expert hatter being unable to make as good a hat in the dry, summer weather as during the rainy season ; probably on this account hats in some parts of the Suaza district are superior to those made just a short distance away.

Long training is necessary to become a good hatter, and the girls are started at the work at the very early age of ten years and must practise constantly. Hatters work every day from early morning, wasting very little time in eating and often carrying on their work by candlelight, so as to finish in time for market day, for the loss of an hour may mean to them the loss of the money which would have been acquired from the sale of the hat.

It may be mentioned that another species of the genus *Carludovica* (*C. jamaicensis*) yields the straw from which the jippi-jappa hats are made in Jamaica. An interesting account of this plant appeared in the *Bulletin of the Botanical Department*, Jamaica, for October 1902.

THE SEA ISLANDS OF SOUTH CAROLINA.

The *Textile Mercury* of August 20 has the following interesting note on the Sea Islands and cotton production :—

A few people are under the impression that Sea Island cotton is grown in the South Sea Islands, whereas it is in those islands which form an archipelago on the south-east coast of the United States, extending from the mouth of the Savannah river northward along the coast to Charleston, that give their name to the special class of black, free-seed, long-staple cotton so commonly mentioned. The four larger islands are James, Edisto, Wadmalaw, and John's, which occupy an aggregate area of some 100,000 acres. There are five smaller islands, severally named St. Helena, Lady's, Paris, Port Royal, and Spring. The climate is sub-tropical and the average annual rainfall about 33 inches. The precipitation is greatest at the time the cotton plants are growing, between May and August ; lowest when they are ripening, from September to November. The islands lie in about 33° north latitude, the same as Bermuda. After the civil war (1860-4) cotton from the Sea Islands commanded 6*s.* 3*d.* to 8*s.* 4*d.* per lb. Later on, in 1867, trouble began in the form of labour difficulties, excessive rains, and the appearance of the destructive cotton worm, and continued for some four or five years. As a consequence, the methods of cultivation had to be altered, the planting of large tracts being discontinued, and replaced by the intense cultivation of smaller areas. At present the Sea Island planters are enjoying the benefit of this new system, which was introduced first on James Island.

Lecture Experiments. The teacher should set up the experiment before the class, carefully explaining, or rather letting them work out from his remarks, the logic of each step. Each student should then for himself observe and record results, and deduce conclusions as if the experiment were entirely his own. It is particularly necessary that the students understand the exact logic of each step, and that their records should bring it out clearly. Their records, too, should express and keep perfectly distinct (a) the object of the experiment, (b) the method and apparatus employed, (c) the results actually observed, (d) conclusions. (*The Teaching Botanist.*)

THE AVOCADO PEAR IN FLORIDA.

A bulletin, * recently issued by the Bureau of Plant Industry of the United States Department of Agriculture, contains a complete account of the propagation, cultivation, and marketing of the avocado pear (*Persea gratissima*). As this tree is widely cultivated throughout the West Indies, the following short summary is likely to be of interest:—

The avocado has never been subjected to cultivation and careful breeding. These pages have been prepared with a view to systematizing our knowledge of it and to pointing out the directions for its improvement.

For Wind-breaks and Shade purposes.—The vigorous-growing varieties of avocado will serve as wind-breaks as satisfactorily as purely ornamental trees, and in addition may be expected to give a return of fruit. The tall, sturdy growth makes free pruning of the lower limbs possible, while the abundant growth of leaves will still produce a dense shade.

Methods of starting an Orchard.—While there are various ways in which orchards can be successfully started, the following is recommended. Place the seeds in a well-prepared seed bed, from 4 to 6 inches apart in a drill, 3 or 4 inches deep. Transplant from the seed bed to the nursery when the seedlings are from 6 to 12 inches high. For transplanting rainy weather should be chosen, otherwise much watering will be necessary. In the nursery the rows should be from 4 to 6 feet apart, and the trees set about a foot apart in the row. After planting in the nursery, cultivation should be thorough and frequent.

Budding.—In the avocado there seems to be no difficulty in making the buds take, but there is considerable difficulty in making them start. Experience indicates that budding at or near the crown is preferable to top-working. It is very important that the stock and scion be in as perfect condition as possible. The common shield-bud method seems to be as successful as any that have been tried.

Transplanting to the Field.—A tree should not be transplanted from the nursery until it has attained a height of about 3 feet. In taking up these trees as many of the smaller roots should be secured as possible. The roots should be kept moist, and the tree well watered when set out. The top should be cut back to some extent, but enough foliage left to shade the stem. If the tree is not sufficiently provided with leaves, an artificial shade can be made by the use of palmetto fans. A considerable quantity of mulch should be placed about them: this prevents the soil from becoming hot about the roots and from drying out.

One hundred budded trees to an acre are sufficient. Of the large-growing varieties eighty trees to the acre will be found sufficient.

Superiority of budded Trees.—Avocados do not come true to seed, and orchards of seedling trees cannot be relied upon to produce good crops. Budded trees bear earlier than seedling trees.

Picking.—As now grown, the fruits of a tree do not as a rule mature uniformly, so that in most cases two or more pickings have to be made. The fruit must be removed from the tree while it is still very firm, if it is to be shipped to a distant market. The fruit should be broken off so as to leave a portion of the stem attached to the fruit.

Packing.—Care must be exercised to have all the specimens in a crate of uniform shape and size. For shipping purposes the market at present demands a tomato crate or an egg-plant crate. Before packing, each individual pear should be wrapped in some substantial and attractive paper.

Pear-shaped fruits and oblong shapes are preferred. Round are less desirable than bottle-necked fruits.

* *Bulletin* No. 61. 'The Avocado in Florida; its propagation, cultivation, and marketing.' By P. H. Rolfs. Washington, 1904.

THE CULTIVATION OF CACAO.

The following note on the cultivation of cacao in Colombia appeared in the United States *Monthly Consular Reports* for April:—

For the information of persons desirous of engaging in the cacao business in our insular possessions, I submit the following memorandum of the process gone through in Colombia in preparing this bean for commerce.

The first thing is to observe care in gathering the crop in season, or the bean suffers in appearance and quality.

The cacao berry is generally extracted at the plantation, thus avoiding transportation of the husk.

No machinery is used for the purpose of extracting the berry, the husk being broken by hand with a wooden mallet or with a short, curved-edge machete. The husk is cut open lengthways by two cuts on opposite sides, care being taken not to cut the berry.

After opening the husk the grains are removed by hand or a small wooden ladle and taken to the cleaning house, where they are put in a wooden tank, having a slight slope, or in a room tiled with bricks and also having an inclined floor, the object of which is the draining off of the fluid from the cacao. This tank or room is known as a drain. The cacao is left to drain from thirty to forty-eight hours and is then placed in the sun to dry, either in brickyards or on hurdles of wood, which can be covered with sacking.

After a day in the sun it is stored two days for fermentation, as this is necessary to give the cacao grains the market requirements. It is then placed in the sun every day to dry thoroughly and, to hurry this process, it is laid out in layers and stirred frequently with wooden rakes.

Whenever this sunning process is hindered by rain, hurdles are used, being placed over a fire made of dry wood, the latter precaution being taken to prevent smoke. There is also a machine made for the purpose of drying cacao.

During the sunning and previous to laying out in yards or hurdles, and while the cacao is still fairly moist, it should be mixed up with brick dust to which has been added a little common ash in the proportion of about 9 to 1. The result of this is that a varnish-like dust forms over it, giving it not only the necessary colour, but preserving it from what is known as the grub insect.

The husk of the cacao is used on plantations as manure.

Copaiba Balsam. Copaiba balsam is obtained from leguminous trees of the genus *Copaifera* (principally *C. officinalis*), which are indigenous to tropical America. *Copaifera officinalis* is also recorded in several of the West India Islands. The principal varieties are Maracaibo balsam and the Para balsam. According to the *Consular Report* on Caracas, the exports of copaiba oil from Maracaibo amounted, in 1903, to 625 cwt., valued at £3,986. Copaiba is used in the preparation of various medicines and is a specific for bronchial troubles.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 319 of this issue.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, SEPTEMBER 24, 1904. No. 64.

NOTES AND COMMENTS.

Contents of Present Issue.

On pp. 305-6 will be found a summarized account of an article in the *West Indian Bulletin* (Vol. V, no. 2) on the progress made by the cacao industry in the West Indies.

The concluding portion of the progress report on the experiments that have been conducted with sugar-cane varieties on estates in British Guiana is published on p. 307.

An interesting progress report on experiments, carried out in Jamaica to test the suitability of local sugars for use in fruit preserves, is also included in our 'sugar notes.'

Several interesting notes relating to the cotton industry will be found on p. 309. In one of these the position of West Indian cotton on the English market is clearly stated.

On p. 310 an account is given of the manufacture of panama hats.

In the article, on p. 311, on the cultivation of the avocado pear, the advisability of establishing orchards by budding is urged. A brief summary of the methods to be adopted is given.

Under the heading 'Insect Notes' we publish some interesting extracts from recent reports by the Entomologist of this Department.

The Times' review of the work of the Imperial Department of Agriculture is reproduced on p. 317.

Spraying in Lime Plantations.

In the extracts given on p. 314 from Mr. Ballou's report on his visit to Dominica, reference is made to the excellent condition of the lime trees on an estate where spraying was thoroughly carried out last year.

In a recent address to the members of the Dominica Agricultural Society, the Hon. F. Watts referred to the same subject, stating that he had observed a marked improvement in the condition of the trees in the island. 'The lime planters,' he said, 'had evidently been alive to the situation, and had applied repressive measures of a varied nature with very marked success.'

Exhibitions of Colonial Fruit in Great Britain.

In a previous issue of the *Agricultural News* (Vol. III, p. 276) we gave details of two important Horticultural Exhibitions for which preparations are being made in Great Britain.

The first of these is being organized by the Royal Horticultural Society, and will be held at the Society's new hall in London on December 13 and 14 next. Opportunities will be afforded for collective exhibits from each colony in addition to individual exhibits. The Society's officials will, if desired, unpack and stage exhibits, provided they arrive in good time.

The other exhibition is that being arranged for by the Royal Caledonian Horticultural Society to be held in Edinburgh in September 1905. It will be seen that a special class is open to the colonies for fruits and vegetables of any sort.

In these two exhibitions the West Indian Colonies have an excellent opportunity of bringing their products prominently before the notice of the British public. Such an opportunity of promoting trade should not be allowed to slip, and we trust that full advantage will be taken of it.

The Oil Seed Trade of Marseilles.

An important feature of the trade of the port of Marseilles is the oil seed industry. According to the *Consular Report*, this trade was exceptionally good during 1903. On account of the record crops of sesame seed and ground nuts in India and on the west coast of Africa, the prices of raw material were low. The principal oil seeds imported are ground nuts, gingelly (*Sesamum indicum*), cocoa-nuts (copra), castor oil, cotton, linseed, palm nut, etc.: the gingelly and undecorticated ground nuts yield edible oils, while oils from the other seeds are used in the Marseilles soap industry and for technical purposes. The large imports of oil seeds have rendered unnecessary the importation of manufactured oils.

There is a considerable export of ground nut husk meal from Marseilles. The undecorticated nuts are shelled, and the shells ground to a whitish powder which is used for cattle feeding. It is mainly exported to Hamburg and Stettin, where it is mixed with molasses, forming a good, brittle cake. All the linseed and practically all the gingelly and poppy cakes are consumed in France for feeding cattle or manuring.

Exports of Hayti.

The *Annual Report* on the trade of Hayti has recently been issued. The principal exports of the republic are coffee, cacao, logwood, yellow wood (fustic), guiac (lignum vitae), cotton, wax, cocoa-nuts, etc. The principal market for these products is at Havre. The exports of coffee and yellow wood show a decrease, while cacao, logwood, and guiac were exported in greater quantities than in the previous year. There was an increase in the cultivation of cotton, and the output was much augmented. The shipments of cotton are expected to reach 4,000,000 lb. in 1904.

It is reported that there are no signs of any agricultural progress; the principal articles of export are allowed to grow wild, and it is only at harvest time that any attention is paid to them.

Sugar-cane Experiments in British Guiana.

From the progress report on experiments with varieties of sugar-cane in British Guiana, published in this and the preceding issue of the *Agricultural News*, it will be seen that experiments have been conducted on twenty-four plantations, the principal varieties, other than the Bourbon, being the White Transparent, D. 109, and B. 147.

Very good results have been obtained with D. 625, in respect not only of its yield of sugar but also of its ratooning powers, its milling qualities, and the quality of its megass as fuel. This cane and also D. 109 are therefore recommended to cane farmers for trial.

The yields of some varieties—D. 74, the White Transparent, and D. 78—have fallen off, and the further extension of their cultivation is not recommended.

Cacao in the Dutch East Indies.

An article in *Der Tropenpflanzer* for August gives an account of the position of the cacao industry in Java and other Dutch islands in the East Indies.

The cultivation is not carried on to a large extent, but trees are found in gardens and in mixed plantations. The product is worked up by Chinese labourers.

The trunks of older trees suffer from the canker disease (? *Nectria* sp.), young twigs are killed by the so-called 'djamur upas' disease, and pods are darkened (? by *Phytophthora*). Pods are also bored by caterpillars of a small moth, and are attacked by several other insects; the plants also suffer much from leaf-eating insects.

The exports of cacao from Java have increased from about 350 tons in 1890 to about 1,200 tons in 1903; in 1902 the yield was only about 800 tons, and in 1901 it was about 1,100 tons. The other islands, Celebes and the Moluccas, export very little.

The yield is small, working out at less than $\frac{3}{4}$ lb. of marketable product per tree. According to Dr. Zehnter, this is due, in part, to the fact that cacao is only planted in land that cannot be used for coffee, in part to irrational treatment of the plants and the consequent loss by insects and diseases. Most of the cacao is exported to Holland.

Cotton Cultivation in St. Vincent.

We are glad to observe that in St. Vincent considerable interest is being taken in cotton cultivation.

Reference has been made in the *Agricultural News* (Vol. III, p. 261) to the establishment in the island of a Cotton Growers' Association. A meeting of this body was held on September 5, when important business was transacted. A letter was read from the Governor in which his Excellency consented to become the President of the Association, and another from the Imperial Commissioner of Agriculture recognizing the Association as a representative agricultural body of the island. It is evident that such a strongly organized body as the St. Vincent Cotton Growers' Association will be of the greatest value in furthering the interests of cotton growers.

In our last issue we gave a list of fixtures which had been arranged in St. Vincent for the illustrated lectures on cotton growing. From reports received by last mail we learn that several of these lectures had been given and had, on the whole, been well attended.

West Indian Bulletin.

The second number of Volume V of the *West Indian Bulletin* (issued to-day) contains a number of interesting articles. Notes upon a variety of West Indian fodder plants have been collected and are published. These notes will supplement the paper by the Hon. Francis Watts in a previous issue of the *West Indian Bulletin* (Vol. III, pp. 353-62).

The article on 'Cold Storage of Fruit' contains the most recent information on the subject of the transportation of fruit, which has been obtained from experts connected with the fruit trade. In view of the efforts that are at the present time being made to establish a fruit trade between several of these islands and the United Kingdom, this article is likely to be of particular interest.

The next article deals fully with the 'Bacterial Rot of Onions,' previously referred to in the *Agricultural News* (Vol. III, p. 245).

Attempts have been made in the West Indies to introduce the cultivation of the Date Palm (*Phoenix dactylifera*). Suckers have been obtained from Algeria and planted out in Jamaica and Trinidad. An account of these and other experiments is given, as also a summarized description of the methods of cultivating the date palm in Northern Africa and the Persian Gulf region.

The next article is devoted to the 'Sisal Hemp Industry.' This article gives a complete account of the establishment of this industry in the Bahamas; references are also made to the successful cultivation of sisal in the Caicos Islands.

The concluding article is an interesting description, by Mr. L. Lewton-Brain, B.A., F.L.S., of the 'West Indian Anthracnose of Cotton.' Mr. Lewton-Brain's paper, which is illustrated by a number of drawings, shows that this disease is caused by a variety of the fungus (*Colletotrichum gossypii*), which is the cause of the American anthracnose.

INSECT NOTES.

Dominica.

The following extracts are taken from Mr. Ballou's report on his recent visit to Dominica:—

As the time at my disposal was very short I made no inspection of the gardens and nurseries. Some time was spent in discussing a disease of the pine-apple and an injury to cacao which Mr. Brooks brought to my notice. The pine-apple disease appeared to be 'Tangle root,' while the injury to cacao seemed to be due to the action of wind rather than to any specific disease.

The two fumigation chambers have been completed and are in place at the Botanic Station ready for the fumigation of imported and other plants.

Some time was also spent going over the lime groves on the Bath estate. Most of the lime trees were in excellent condition, and though a few scale insects were to be seen, the beneficial effects of the thorough and systematic spraying done in 1903 were very evident. No spraying has been done on the Bath estate on the present crop (1904), which, Mr. Frampton informed me, promised at that time to be the largest in recent years. On one lot (No. 12) Mr. Frampton pointed out several trees that had set large numbers of fruits which had dropped while still quite small, leaving only very few to develop. The cause of this was not apparent, and in view of the large crop being harvested, it would not seem that much loss had resulted from the dropping of the fruits, but in another year when the crop was lighter its effects might be much more noticeable. The trees on which this condition was observed were all old and slightly infested with scale insects (*Mytilaspis citricola*), and in some cases the tips of the branches from which the limes had fallen, were infested, but without further investigation it could not be asserted that they caused the young fruit to drop.

Antigua.

In his report on his recent visit to Antigua, Mr. Ballou makes the following interesting observations:—

At the time of my visit Antigua was suffering from an unusually prolonged and severe drought, the effects of which were plainly to be seen in the condition of the plants at the Botanic Station, of the crops on the estates, and in the appearance of vegetation generally.

In the nursery I discovered a red bug very similar to the cotton stainer of the Southern Islands (*Dysdercus andreae*). This insect was feeding on the seeds, seedlings, leaves, and stems of the Balloon vine (*Cardiospermum Halicacabum*) in much the same way that the cotton stainers feed on the cotton. It proves to be quite a distinct species from the cotton stainers. It had not been previously noticed, and as syraying was at once resorted to, it is hoped to prevent its spread.

At Scott's Hill the seedling limes were quite free from scales. They had recently been sprayed. The lime hedge, however, was attacked by scales and a plot of cotton which was still standing was attacked, but this latter had yielded its crop and was about to be taken out and burned.

At Bendall's the canes which were at the factory were seen to be infested by the cane scale (*Aspidiotus sacchari*). It seems likely that this scale would have been much less conspicuous, perhaps not noticeable, had the canes been harvested at the usual time, but the harvesting of the crop had been delayed on account of the changes being made in the factory.

In some parts of the island the gold tick (*Hyalomma aegypticus*) was abundant, and there were a few cases of skin disease of cattle reported. At Skerrett's one animal was seen with skin disease, but no ticks were to be found. This animal (a young bull) has had the skin disease since last year, and though not getting better does not apparently get any worse. Most of the disease among cattle seemed to be due more to poor water and scarcity of feed and pasturage than to the skin disease. There seems to be a difference of opinion as to the relation of the ticks to this disease.

Another serious problem is the disease of Antigua pine-apples. This disease has already had a very bad effect on the trade in pines, as many pines are lost in shipment; pines which appear perfectly sound from without are found to have black hearts when cut.

The cotton worm which has no other recorded food plant than cotton is said in Antigua to feed on the wild tamarind (*Pithecolobium filicifolium*). In Antigua also it is reported that the gaulding feeds on the cotton worm.

IMPERIAL DIRECT WEST INDIA MAIL SERVICE.

Prior to the departure of the S.S. 'Port Kingston,' the latest addition to the Imperial Direct West India line of steamers, a luncheon was given on board by Sir Alfred Jones, which was attended by a representative company of merchants, shippers, and others. Responding to the toast, 'Success to Jamaica and the West Indies,' Sir Daniel Morris said:—

He was of opinion that the West Indies, as a whole, were beginning to improve, after having had a long spell of bad times due to circumstances beyond their control. Now that the sugar bounties had been removed there was a better chance for that industry, and he believed that with fair play the sugar industry of the West Indies had as good a chance of being a success as that in any part of the world. He paid a tribute to the splendid work which Sir Alfred Jones had done for the West Indies in many directions outside the contract in connexion with the West Indian line. The Imperial Direct Company had done its best in the interests of Jamaica, and he believed it was possible for it to do still more by conference with the people of Jamaica, and by meeting their reasonable wishes as regards the shipment of fruit and produce. He was, he said, in full sympathy with anything calculated to improve the service between this country and the West Indies. The company had already carried upwards of one and a half million bunches of bananas and had brought to this country about 35 million oranges besides other products. At his own expense Sir Alfred Jones had carried on the vessels a large quantity of live stock, he had sent out men to inquire as to the tea industry, and he had sent out mining experts, whilst in other ways steps were being taken to develop the resources of Jamaica. He rejoiced at the evidence to-day of the coming prosperity of the West Indies.

DOMINICA AND SHIPPING FACILITIES.

Dr. H. A. A. Nicholls, C.M.G., has forwarded a copy of a letter addressed by him, as Vice-President of the Dominica Agricultural Society, to the Quebec Steamship Company relative to the present arrangement 'whereby some of your company's vessels pass by Dominica on the outward voyage.' It is also complained that cargo destined for Dominica is kept over by the agents in New York until there is 'a sufficient accumulation to warrant, in their opinion, the stoppage of one of the steamers at the island.' That this practice is detrimental to the trade of the island is manifest from the following extracts:—

As a case in point, I may cite the following facts:—During the season a very considerable quantity of fruit, such as oranges and limes, is shipped from this island by your steamers. The trade is a growing one and naturally it needs fostering, if its capabilities are to be realized to their fullest extent. On June 22 last, a shipment of orange boxes was sent to your New York wharf for a firm in this island, and the boxes were detained until July 20, by which time your New York agents decided to take freight for Dominica. This occasioned a month's delay in the receipt of the boxes, and it caused, moreover, the suspension of fruit shipments by the firm in question, the stoppage of further orders for fruit boxes, and the consequent loss of the trade to the island and to your company.

It may be that in the opinion of your New York agents the trade between that city and Dominica is not now sufficiently large to warrant the calling at the island of all the outward-bound West Indian steamers, but Dominica is becoming prosperous and its exports and imports are increasing yearly, and the system adopted by Messrs. Outerbridge & Co. is calculated to retard the augmentation of trade relations with New York, and with Canada through New York, for in order to save time on the journey it is necessary for fresh fruit shipped to Montreal and Toronto to go via New York, as the route by St. John, N.B., is long and circuitous.

I would ask that the above facts may meet with the serious and sympathetic consideration of yourself and the Board of Directors of your company, and I trust you will be able before long to authorize me to inform the Agricultural Society that all your outward-bound steamers to the West Indies will call at Dominica, which is on their route to the south, so that the arrangement will involve very little extra expenditure and not much delay.

THE PRODUCTION OF FISH MANURE AND FISH OIL.

The *Journal of the Society of Arts* contains an interesting article on the production of fish manure and oil in Saghalien. It is stated that a great demand exists in Japan for fish manure, and oil obtained by pressure from the fish used for manure is employed, when properly refined, as a lubricant and for other purposes. After describing the fishing operations, the following description is given of the extraction of the oil, which, in view of the attempts that have been made to work up a trade in fish oils in Dominica, is likely to be of interest:—

On arrival at the beach, the bag net is emptied, and the fish thrown into an enclosure fenced in by laths, some 6 feet high. On one side of the enclosure are a number of round iron boilers, 4 or 5 feet in diameter, erected on built-up fireplaces. The fish are taken from the enclosure by removing the laths, and are thrown into the boilers. After cooking, they are put into wooden presses, 2 feet 6 inches square by 2 feet in depth, the sides and bottom of which are composed of slates, with interstices a quarter of an inch wide between them. A lid is then placed on the top, and pressure exerted in a downward direction by means of levers. The oil and water pressed from the fish escape through the interstices in the side and bottom of the press on to a wooden flooring from which a conduit leads to a tank. The tank is divided by a partition, two-thirds its height, into two compartments. The conduit leading from the press discharges its contents into the first compartment, and as that fills, the oil rising to the surface flows over into the second compartment, leaving the water and other heavier substances in the first. The oil is then put into cans and is ready for shipment.

Such has been the process hitherto followed, but in the coming season it is intended partially to refine the oil by straining it through coarse Japanese paper previous to canning. The fish after being pressed, form a compact rectangular mass; this is broken into small pieces, which are laid out on straw mats to dry in the sun. When dried, the fish or, as it now is, fish manure, is packed in straw bales for transport, and is ready for use.

From the foregoing brief description an idea will be obtained of the primitive methods employed in this industry, and also of the amount of valuable commercial product which must necessarily be wasted in consequence of the adoption of these methods. By the use of modern machinery a far larger output of fish manure and oil could be obtained from the same weight of fish.

DEPARTMENT NEWS.

It is probable that Sir Daniel Morris will return to the West Indies in R.M.S. 'Trent,' leaving Southampton on October 12.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, left Barbados in S. S. 'Sibun' on Tuesday, September 13, for St. Lucia. Mr. Ballou will spend some time in St. Lucia for the purpose of inspecting cotton experiment plots and advising planters generally as to the cultivation of cotton and the treatment of pests.

Mr. John Belling, B.Sc., Agricultural and Science Master at St. Kitt's, has been granted six weeks' vacation leave of absence from September 12.

Dr. R. A. Stoute, D.V.S., Veterinary Surgeon to the Imperial Department of Agriculture, has been granted eight weeks' leave of absence from September 16. During his absence, his duties will be performed by Dr. Percy Stoute, D.V.S.

Bee Farming in Australia. During the year 1902-3, there were 4,402 bee keepers with 32,126 hives in the State of Victoria, Australia. They produced 1,199,331 lb. of honey and 23,061 lb. of wax.

GLEANINGS.

It is notified that the first of a series of lectures on Agricultural Science in Berbice will be delivered at All Saints' School, New Amsterdam, on December 7, 1904.

The orange crop of Barcelona was very abundant in 1903, and the farmers obtained good prices. From Valencia and Denia 564,434 cases were exported. (*Consular Report*, 1903.)

The fifth annual Agricultural Show under the auspices of the Imperial Department of Agriculture will be held at Montserrat during the month of February.

The rainfall at Antigua during the year 1903-4 amounted to 63·04 inches. This is 7·80 inches more than in the preceding year, and 16·33 inches more than the average for the past thirty years.

The Agricultural Instructor at Dominica reports that at St. Sauveur Father François has been successful in the cultivation of asparagus in his kitchen garden. The crop was ready for reaping in thirteen months.

Among the exports of St. Lucia during 1903 the following items are of interest: *Cassia Fistula*, 16 packages (value, £20); musk seeds, 25 barrels (value, £83 10*s.*); pimento sticks (value, £554 10*s.*).

Mr. H. Millen, Curator of the Tobago Botanic Station, writes: 'Bamboos are found growing on almost all the hillsides where cacao is being planted. As they grow rapidly and are not easily uprooted, they are being retained as wind-breaks.'

Mr. J. R. Bovell, Agricultural Superintendent at Barbados, has received an order from a firm in England for 5 barrels of sweet potatos and 1 barrel of yams each month. Any one desiring to ship these vegetables should communicate with Mr. Bovell.

A company has been floated in Jamaica for providing a system of cold storage. It is proposed to supply fresh meat to ships. The company is also desirous of working up a connexion with other West Indian Islands for the supply of beef and mutton.

During the fortnight ended August 25, 47 bales of West Indian cotton were imported in the United Kingdom. Sales have been effected at the following prices: West Indian, 4*d.* to 6·34*d.*; West Indian Sea Island, medium fine, 13*d.*; fine, 14*d.*; extra fine, 16*d.* (*West India Committee Circular.*)

The rubber industry should be of far greater importance than it is at present. There are in Guatemala large tracts of land suitable for growing rubber; but owing to the impossibility of sufficiently policing the country, the rubber is frequently stolen from the trees. (*Consular Report*, 1902-3.)

An Agricultural Show will be held at the Agricultural School, St. Vincent, under the auspices of the Imperial Department of Agriculture and a local committee, in March 1905. It is hoped that intending competitors will avail themselves of this early notification in the preparation of exhibits.

At a recent meeting of the Trinidad Agricultural Society, Mr. J. H. Hart exhibited specimens of the Mexican melocoton grown in the colony. This vegetable is used like a vegetable marrow. The melocoton has also been grown successfully at the Botanic Station at St. Lucia.

There has been an increase in the export of oranges from Jaffa during the last few years. According to the *Consular Report* on the trade of Palestine, the exports of oranges in 1903 were valued at £93,435 as against an average value of £83,535 for 1899-1903. Further planting is in progress.

The *Maritime Merchant* of August 11 contains an account of an interview with Mr. C. S. Pickford, of the firm of Pickford & Black, who has recently paid an extended visit to these islands. Mr. Pickford speaks encouragingly of the improved industrial conditions of the West Indies, making special mention of the sugar industry and of cotton growing.

We are informed by a successful grower of onions in Barbados that he has experienced no trouble from ants when the seed has been sown, as recommended in the last issue of the *Agricultural News*, in drills. Where, however, the seed was merely scattered over the surface of the bed, a considerable proportion was lost.

In the course of a discussion at a meeting of the British Guiana Board of Agriculture on the advisability of importing cocoa-nuts for cultivation, Professor Harrison stated that he had obtained nuts from Singapore and Trinidad, and had come to the conclusion that nuts grown in the colony compared very favourably with those imported. What was required was selection, both for planting and for shipping.

In the Natal *Agricultural Journal* for July 22, considerable space is devoted to notes on cotton cultivation, which include a number of extracts from the *West Indian Bulletin*. In an editorial note it is stated that copies of the *West Indian Bulletin*, Vol. IV, no. 4, have been obtained by the Natal Agricultural Department, which may be obtained on application, price 1*s.*

During the quarter ended June 30, 1904, 1,438 bales and 12 bags of cotton were exported from the British West Indies. The total weight was 415,209 lb., and the estimated value £13,314 14*s.* The shipments were all to the United Kingdom. Particulars of the cotton exports for the previous quarter will be found in the *Agricultural News* (Vol. III, p. 204).

THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

The following appreciative review of the work of the Imperial Department of Agriculture appeared in *The Times* of August 27, 1904:—

In the midst of other and larger colonial preoccupations the West Indies have of late attracted little public attention in this country. In some respects that is a good sign, since prosperity is generally very well content to be let alone, and as such we may fairly take it in the light of the speech delivered at Avonmouth the other day by Sir Daniel Morris, the Imperial Commissioner of Agriculture for the West Indies. No man is better qualified to speak with authority on this subject than Sir Daniel Morris. He has known the West Indies as few men know them for over a quarter of a century. He has known them in the days of their deepest depression, as was shown by the report on their economic condition which he prepared for the Royal Commission of 1896. He has seen those days pass away and he has himself been largely, we might say mainly, instrumental in bringing about a better state of things. It would hardly be possible to exaggerate the benefits, actual and prospective, which have been conferred on the West Indies by the Imperial Department of Agriculture, established by Mr. Chamberlain, and organized with admirable skill and energy by Sir Daniel Morris. Established at a very critical time, when the sugar industry, once the mainstay of West Indian prosperity, was being slowly bled to death by the desolating rivalry of the sugar bounties, when the planters were discouraged and impoverished, when some of the islands depending solely on sugar were on the verge of ruin, when, except in Jamaica, which had secured a large market in the United States, other agricultural industries were very imperfectly developed, the Department has in a few years done more than any other single agency to save and restore the whole situation. For the abolition of the sugar bounties it is not, of course, directly responsible, but by its systematic researches and experiments on the cultivation of the sugar-cane it has done a very great deal to enable the West Indian planters to reap the full benefit of that most salutary measure. It has organized and encouraged the development of such alternative agricultural industries as are best suited to the climatic conditions of the several islands; and, above all, it has promoted the cultivation by the best methods, and with the most approved appliances, of Sea Island cotton, a measure which, though it may have no very conspicuous effect on the cotton market in this country, and no commanding share in the industrial economy of the Empire, is undoubtedly one of real Imperial import, and of large promise for the future of the West Indies themselves.

This is a very different picture from that which Sir Daniel Morris was compelled to draw for the Royal Commission of 1896. Nor is it the only proof we have that the West Indies are about to see better days. The occasion on which Sir Daniel Morris spoke is another. His speech was delivered at Avonmouth on board the 'Port Kingston,' the largest and best appointed steamer that has ever been devoted to the West Indian trade. Five years ago scarcely any one had ever seen a Jamaica banana in this country. Now it is to be bought in all parts of the country at a price which brings it within the reach of all but the very poorest. This is due to the establishment of the Imperial Direct Line of steamers to Jamaica—another of the measures undertaken by Mr. Chamberlain on the recommendation of the Royal Commission. A large market for Jamaica bananas has been created in this country, such as must result, in the long run, in a large development of the banana industry in Jamaica and a corresponding increase in the cultivation of other fruits, especially the orange; and, though the supply was interrupted for a time in consequence of the hurricane of last year, yet the putting of a new steamer on the line, which can carry 40,000 bunches of bananas and 15,000 cases of other fruits, is a proof that Messrs. Elder, Dempster & Co., the owners and founders of the line, are as fully convinced as Sir Daniel Morris is that the prosperity of the West Indies, and of Jamaica in particular, is returning.

EDUCATIONAL.

Teaching of Agriculture in Trinidad.

The annual report of the Inspector of Schools in Trinidad for 1903-4 contains the following account of the efforts that are being made to introduce the teaching of agriculture in elementary schools:—

The methods adopted for fostering and maintaining a love of 'Nature study' are:—

(1) Making practical agriculture and 'Nature teaching' a part of the curriculum in all rural primary boys or mixed schools.

(2) Establishment of school gardens wherever practicable.

(3) Free distribution to teachers of agriculture literature, such as the *Agricultural News*, the *Bulletin of the Botanical Department*, and the *Proceedings of the Agricultural Society of Trinidad*.

(4) Periodical visits to schools by the Agricultural Instructors to give advice and instruction.

(5) Bi-weekly lectures on chemistry to the male students of Port-of-Spain Training Schools by one of the Government Laboratory Assistants.

(6) Weekly lectures on practical agriculture to the male students of the Port-of-Spain and San Fernando Training Schools by an Agricultural Instructor.

(7) Annual School Vegetable Shows at four agricultural centres of the colony.

With a view to stimulating teachers in their efforts to carry into effect the first and second of the above measures, the Board of Education has adopted two methods:—

(1) By a re-adjustment of the scale of bonuses an award for agriculture is given to the teacher by the Inspector on the results at the annual examination.

(2) By obtaining the highest award ('very good') in the subject of practical agriculture for three successive years, a third-class head teacher of ten years standing, may be promoted to the second class. In this way five teachers have gained promotion to the second class during the past year.

The advantages gained by thoroughly grounding our teachers in a knowledge of the elementary principles of agriculture can hardly be over-estimated. I hope that it may be found possible in the future to send the Agricultural Instructors more frequently to the country schools. Nearly 200 of our primary schools now have gardens, and however successful these may be in the production of vegetables, if the experimental (and more purely educational) part of the work is to be of any practical utility, the advice of the expert will be constantly needed. I am glad to be able to report that in a few of the schools of the southern district, exceptionally good work of this character is in progress, and some interesting notes with reference to it are given in the report of the Senior Assistant Inspector.

MARKET REPORTS.

London,—August 30, 1904. Messrs. J. Hales Caird & Co., Messrs. Kearton, Piper & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular, August 26; and 'The Public Ledger,' August 27, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* per ℔.
Balata—Block, 1/3 per ℔.
Bees'-wax—£7 5*s.* to £7 15*s.* per cwt.
Cacao—Trinidad, 58/- to 62/- per cwt.; Grenada, 54/- to 58/- per cwt.; Dominica, 49/- to 57/- per cwt.; Jamaica, 51/- to 57/6 per cwt.
Cardamoms—Mysore, 7½*d.* to 2/- per ℔.
Coffee—Jamaica, good ordinary, 38/- per cwt.
Cotton—West Indian Sea Island, medium fine, 13*d.*; fine, 14*d.*; extra fine, 16*d.* per ℔.
Fruit—
Bananas—Jamaica, 4/- to 8/- per bunch.
Grape Fruit—Jamaica, 10/- to 11/- per case.
Oranges—Jamaica, 8/6 to 11/- per case.
Pine-apples—Antigua, 14/- per barrel.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Fair to good bright, 42/6 to 47/6; common to middling, 29/- to 37/6 per cwt.
Honey—15/- to 24/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/10; cake, 1/1 to 1/3 per ℔.
Kola Nuts—4*d.* to 7*d.* per ℔.
Lime Juice—Raw, 1/3 to 1/5 per gallon; concentrated, £14 per cask of 108 gallons.
Lime Oil—Distilled, 1/6 to 1/7 per ℔.; handpressed, 2/9 to 3/- per ℔.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Fine pale, 1/8; Fair red to good pale, 1/2 to 1/5; per ℔.
Nitrate of Soda—Agricultural, £10 5*s.* per ton.
Nutmegs—59's, 2/4; 76's, 1/2; 100's, 9*d.*; 150's, 5*d.* per ℔.
Pimento—2¾*d.* per ℔.
Rum—Demerara, 7*d.* per proof gallon; Jamaica, 1*s.* 9*d.* to 1*s* 9½*d.* per proof gallon.
Sarsaparilla—Jamaica, 7*d.* to 1/1 per ℔.
Sugar—Crystallized, 16/9 to 17/3 per cwt.; Muscovado, Barbados, 13/6 to 14/- per cwt.; Molasses, 11/6 to 15/- per cwt.
Sulphate of Ammonia—£11 17*s.* 6*d.* per ton.

Montreal,—August 8, 1904.—Mr. J. Russell Murray. (In bond quotations.)

Bananas—Jamaica, 85c. to $1·00 per bunch of 8 hands; $1·15 to $1·25 per bunch firsts; $1·50 per bunch Jumbos, c. & f.
Cedar—Trinidad, 40c. per cubic foot, c. & f.
Cocoa-nuts—Jamaica, $25·00 to $27·00; Trinidad, $21·00 to $24·00 per M., c. & f.
Coffee—Jamaica, medium, 8½c. to 9½c. per ℔., c. & f.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per ℔., c. & f.
Limes—Jamaica, $4·00 per barrel, c. & f.
Molascuit—Demerara, $1·32 per 100 ℔., c. & f.
Molasses—Barbados, 24c. to 26c.; Antigua, 20c. to 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 17c. to 18c. per ℔., c. & f.
Pimento—Jamaica, 7¼c. to 7½c. per ℔., c. & f.
Pine-apples—Cubans, crates 36's to 18's, $3·75 to $4·10.
Sugar—Grey Crystals, 96°, $2·55 to $2·60 per 100 ℔., c. & f.
—Centrifugals, 89°, $2·25 to $2·30 per 100 ℔., c. & f.
—Molasses, 89°, $2·10 per 100 ℔., c. & f.
—Barbados, 89°, $2·35 per 100 ℔., c. &. f.

New York,—August 19, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¼c. to 13c.; Jamaica, 9¾c. to 11½c.; Grenada, 12c. to 12½c.; Trinidad, 12c. to 13c. per ℔.
Cocoa-nuts—Trinidads, $25 to $27 per M., selected; Jamaicas—$30·00 per M.
Coffee—Jamaica, fair to good ordinary, 8½c. per ℔.
Ginger—Jamaica, 7c. to 8c. per ℔.
Goat Skins—Jamaicas, 52c. to 54½c. per ℔.
Pimento—4⅞c. per ℔., spot quotation.
Sugar—Centrifugals, 96°, 4¼c.; Muscovados, 89°, 3 11/16c. to 3¾c.; Molasses, 89°, 3 7/16c. to 3½c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—September 10, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·50 to $3·60 per 100 ℔.
Cacao—Dominica, $13·50 per 100 ℔.
Cocoa-nuts—$13·50 per M. for husked nuts.
Coffee—Jamaica, $10·00 to $11·00; ordinary Rio, $12·00 per 100 ℔.
Hay—95c. to $1·00 per 100 ℔.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
Molasses—Market closed.
Onions—Madeira (stringed), $1·75 per 100 ℔.
Potatos, English—$2·88 to $3·00; Nova Scotia, $3·09 per 160 ℔.
Rice—Ballam, $4·50 to $4·60 per bag (190 ℔.); Patna, $3·40 per 100 ℔.
Sugar—Market closed.

British Guiana,—September 8, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 per barrel.
Balata—Venezuela block, 25c.; Demerara sheet, 35c. per ℔.
Cacao—Native, 12c. to 13c. per ℔.
Cassava Starch—$6·50 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 13c. to 13½c. per ℔. (retail).
—Creole, 11c. per ℔.
Dhal—$4·25 to $4·40 per bag of 168 ℔.
Eddoes—84c. per barrel.
Molasses—Vacuum Pan yellow, 15½c. per gallon (casks included).
Onions—Madeira, $1·80 to $1·90 per 100 ℔.; Teneriffe, $1·50 to $1·75 per 100 ℔.
Pea Nuts—American, 7c. per ℔. (retail).
Plantains—20c. to 36c. per bunch.
Potatos, English—Lisbon and Madeira, $1·50 per 100 ℔. (retail).
Rice—Ballam, $4·40 to $4·50; Creole, $4·50 per 177 ℔., ex store.
Sweet Potatos—Barbados, 72c. per bag.
Tannias—$1·68 per barrel.
Yams—White, $2·64 per bag.
Sugar—Dark Crystals, $2·50 to $2·60; Yellow, $2·50 to $2·80; White, $3·50 to $3·75; Molasses, $2·00 to $2·25 per 100 ℔.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—September 8, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary, $12·20 to $12·35; Estates, $12·40 to $12·60; Venezuelan, $12 50 to $12·75 per fanega (110 ℔.).
Cocoa-nuts—$19·00 per M., f.o.b.
Cocoa-nut Oil—73c. per Imperial gallon (casks included).
Coffee—Venezuelan, 7½c. to 7¾c. per ℔.
Copra—$2·85 per 100 ℔.
Onions—$1·20 to $1·25 per 100 ℔.
Potatos, English—$1·40 to $1·50 per 100 ℔.
Rice—Yellow, $4·10 to $4·50; White Table, $4·80 to $5·50 per bag.

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(3) Seedling and other Canes at Barbados, in 1900. Price 2*d.* Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd. Edition Revised. Price 4*d.* Post free, 4½*d.*
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'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 65. BARBADOS, OCTOBER 8, 1904. PRICE 1*d*.

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The Sisal Hemp Industry and the West Indies.

IN regard to soil requirements the sisal hemp plant is not exacting, and there are, in different parts of the West Indies, considerable tracts of land which might be utilized for the cultivation of sisal hemp—land, too, which, on account of its dry and rocky nature, is not suitable for growing other crops. Moreover, there appears to be a considerable demand for this fibre, especially in the United States, and at present, at any rate, the price of sisal fibre is sufficiently high to enable it to be grown very profitably.

As the Imperial Department of Agriculture is anxious to encourage the planting of sisal hemp, full information as to its cultivation and preparation for market has been published in the current issue of the *West Indian Bulletin* (Vol. 5, no 2). In the same article a brief sketch is given of the progress of the industry in the Bahamas and the Caicos Islands.

The cultivation of this plant on a commercial scale is carried on principally in Yucatan, the Bahamas, the Caicos Islands, and Hawaii. The total exports of sisal from Mexico (known there as henequen) in 1902 were 88,087 tons. From the Bahamas, in the same year, 1,042 tons, of the value of £37,574, were exported, while the Caicos Islands exported 222 tons, of the value of £7,100. In the same year 89,583 tons of sisal hemp were imported into the United States.

The sisal industry in the Bahamas has increased in importance during the last eight or nine years to a very considerable extent. At first, as is usual in the initial stages in the establishment of such an industry, more or less serious difficulties had to be met, and doubts were entertained as to the ultimate success of the

ventures: now, however, the industry is well established and appears to be of a decidedly remunerative character.

The progress of the sisal industry in the Caicos Islands, where excellent fibre is produced, is particularly interesting. The commencement of the industry dates from about 1889, when Captain Jackson, then Commissioner of the islands, drew attention to the existence of the plant. Through Captain Jackson's efforts a government nursery was established from which a large number of plants were distributed. The export of sisal hemp began in 1894 with £419 worth: from that time the exports have gradually increased till, as already stated, they reached the value of £7,100 in 1902.

The price of this fibre in the London market has been subject to somewhat violent fluctuations. The highest price reached during the past twenty-five years was £56 10*s.* in March 1889: from that date, owing to the operations of the Cordage Trust, the price fell continually, until in 1895, it reached the lowest price it had ever reached, viz., £13 per ton, or a little less than 1½*d.* per lb. During the past nine years, however, the prices have shown an upward tendency, reaching £43 in 1902; last year the average price was £36 per ton, or about 4*d.* per lb.

In the United States there have been similar fluctuations: during the past ten years the price has varied from 2¾c. to 10c. per lb.

Next, with regard to the yield of fibre. In Yucatan the average yield from the fifth to the seventh year is 75 lb. of fibre to 1,000 leaves. It was estimated by Sir Daniel (then Dr.) Morris in 1896, that in the Bahamas the yield of fibre per acre would not be likely to fall below half a ton. If the cost of production be placed at 1*d.* per lb., there would be a profit of ½*d.* per lb., or over £2 per acre, even at the lowest price (1½*d.* per lb.) that sisal fibre has ever reached. It is obvious, therefore, that, with the price as at present, satisfactory profits should be obtained.

In sisal hemp, then, we have a crop which can be grown in the poor and rocky lands unsuited to other forms of cultivation, its cultivation is a simple matter, and reliable machines can be obtained for preparing the fibre. It will be necessary for planters to direct attention to the uniform production of a first-class fibre to meet the requirements of the best markets, and an endeavour would have to be made to prevent the export of short or immature fibre in order to make a good name for West Indian sisal in the markets.

SUGAR INDUSTRY.

Cane Farming in Trinidad.

The returns of the Trinidad cane farmers' crop for 1904 are published in the *Proceedings of the Agricultural Society* (Paper no. 222). The following table is an abstract showing the returns for the last seven years:—

Year.	Total sugar made. Tons.	Tons of sugar made from estate canes not weighed.	Tons of estate canes ground.	Tons of canes purchased.	Amount paid for canes.	No. of Farmers.		
						East Indian.	West Indian.	Total.
1904	50,744	1,669	385,015	171,947	$360,046	4,646	4,685	9,331
1903	No returns.	1,783	337,632	166,590	$348,445	4,443	4,440	8,883
1902		4,379	337,911	184,867	$327,183	4,506	4,850	9,356
1901		3,652	434,003	169,918	$369,482	3,819	4,737	8,556
1900		1,286	364,355	105,996	$227.865	2,826	3,591	6,417
1899		1,571	426,306	106,741	$219,011	2,826	3,870	6,696
1898		—	—	105,753	$202,901	2,326	3,824	6,150

The Cuban Sugar Industry.

The *Sugar Planters' Journal* contains an interesting review, by Dr. C. A. Kern, of the sugar industry in the West Indies, from which we take the following extracts relating to the possibilities of Cuba as a sugar-producing country:—

The recent passage of the Cuban reciprocity treaty has called the attention of the American sugar world to the resources and history not only of the island of Cuba, but also of the other West Indian Islands, especially Hayti and Santo Domingo.

The increase of the sugar product, and also the lessening of the cost of its production, as reported by the United States Consul-General in Havana, are remarkable, and show what might be accomplished in this line in the other islands.

The cost of cultivation, planting, etc., is $1,201 per caballeria (33·16 acres); this produces, at a fair average, 614 tons of cane; virgin soil yields as high as 1,000 tons of cane, but the afore-mentioned quantity is the average taken from statistical figures. The average yield in sugar is from 195 to 235 lb. per ton, according to the more or less improved machinery employed. The percentage derived by the use of modern machinery is from 10·5 to 11 per cent. of sugar, while that derived by old machinery amounts to from 8·5 to 9 per cent.

The possibilities of enlarging the output of sugar in Cuba are enormous. Of all the available land for cultivation of cane, only one-quarter is cultivated, viz., 12,784 caballerias of the suitable 51,344 caballerias. With proper cultivation and with improved modern machinery Cuba alone is in the position to produce annually about 5,000,000 to 6,000,000 tons of sugar, or about half of the present production of the world.

Sugar-cane Varieties in Mauritius.

In an article in the *International Sugar Journal* on the sugar industry of Mauritius, Mr. Noel Deerr makes the following observations on varieties of canes and seedlings:—

A very large number of varieties of canes are grown: formerly the Louzier, a cane very similar to, if not identical with, the West Indian Bourbon, was the great sugar producer, but its proclivity towards disease has led to its gradual abandonment. The canes most in favour now are the White and Striped Tanna. The latter is the Cheribon cane of Java, a purple and yellow striped cane of great girth and length, fungus-resistant, but inclined to form short joints: the White Tanna is a bud sport from the Striped and is now held in great favour; it reproduces the best points of the parent cane, at the same time not being so inclined to form short joints; from clinical field observation the writer does not think it is so fungus-resistant as the Striped. The Black Tanna, also a bud sport and much resembling the parent cane in habit, is not extensively grown. All these three varieties are gross feeders and do best when grown on rich soils,* or when liberally manured and watered; they give the best comparative results as plant canes, their superiority over the Louzier being less pronounced in the ratoon crops; over a four-crop rotation the writer has no hesitation in putting their superiority over the Louzier at 25 per cent. at least.

Other canes extensively grown are the Port Mackay, a claret cane with inconspicuous, but well-defined, bronze-green stripe, and of average height and girth; this cane is characterized by frequently forming variegated or quite white leaves; the Iscambine, a red cane, and the Striped Iscambine, a yellow and green cane, are also frequently seen; both of these are non-resistant to fungus. The classical Horne cane is also sometimes seen on the estate scale.

The history of seedlings in Mauritius is very peculiar; shortly after the discovery by Soltwedel in Java, and by Harrison and Bovell in Barbados, of the fertility of cane seed, seedlings were successfully raised in Mauritius by Mr. George Perromat; a large number of these were distributed to estates and raised to separate varieties, but the careful systematic work which has characterized the West Indian development of the subject has been entirely absent from Mauritius; each estate which received seedlings numbered them as it thought proper, and as estate managers frequently started seedling nurseries, chaos soon resulted: to cap all a seedling mania arose, and whole fields were put under seedlings, of the properties of which nothing was known; provided a new seedling was well advertised, its fortunate proprietor could sell cuttings at fancy prices, to his own great benefit, and frequently to the detriment of the purchaser. Out of chaos something like order has at last resulted as the outcome of the survival of the fittest, and the following Mauritius seedlings may be mentioned as recognized sugar producers:—

No. 33; a green cane of recumbent habit often forming peculiar abortive joints.

Nos. 53 and 65; both purplish canes of average girth and height.

No. 131; a deep purple cane of slender habit but extraordinarily prolific in the number of canes in a stool.

No. 134; a brown cane at maturity of rather less than average girth.

* 'Tanna' is the native Javanese term for 'rich earth.'

GROUND NUTS IN GAMBIA.

The principal article of export from Gambia is ground nuts. In 1903, the value exported was £275,394, or over 80 per cent. of the total value of the colony's exports for the year. This is the largest output ever known. As this is the principal industry in the colony, the following note, from the *Annual Report*, on its cultivation, is of interest:—

The ground nut which originally came from Brazil is the breath and life of the Gambia. It may be of interest to mention that the nuts are usually planted after the first rains in June and mature in about five months. They are reaped towards the end of October or beginning of November and placed in large heaps in the fields. Early in January the nuts are 'beaten,' as it is termed, in order to separate them from the vines, and from the soil which has clung to them. The clouds of dust raised from this beating can be seen for miles distant. The nuts are then collected and brought to the factories from whence they are shipped direct to Marseilles, where they are crushed in mills and the oil extracted. The oil of the ground nut, which is said to be as much as 40 to 50 per cent. of the weight of the shelled nut, is pleasant to taste and smell, and very closely resembles the best olive oil, for which it is largely sold. The lower grades of oil are used for lubricating purposes and also in the manufacture of soap. After the oil is extracted the refuse is converted into cake or meal for feeding cattle, etc. The best or picked nuts, which command about double the price of the ordinary nuts, are usually shipped to England for confectionery purposes.

The average yield of ground nuts per acre is between 60 and 80 bushels, for which the natives were paid this year, on the average, 1*s.* per bushel. In the previous year the price averaged between 2*s.* to 3*s.* the bushel. In former years nuts were sold by the measure, the price for which was 2*s.* The price never altered; but the measure, which contained anything between 52 to 68 lb. of nuts, often did. With the introduction of the cash trade, however, the measure has gradually disappeared, the natives now selling by weight, a system they much prefer.

PRINCIPAL COMMERCIAL PLANT FIBRES.

In an interesting article on the subject of commercial plant fibres, in the *Yearbook of the United States Department of Agriculture*, the writer classifies fibres as follows:—

Vegetable fibres used in textile manufactures in this country may be readily divided into three rather distinct classes, either from the standpoint of the manufacturer, who regards the kind of machinery or process of treating the fibre and the character of the goods produced, or from the viewpoint of the botanist, who regards the character of the plant and the manner in which the fibre is borne. These three classes are:

(1) The cottons, with soft, lint-like fibre, $\frac{1}{2}$ inch to 2 inches long, composed of single cells, borne on the seeds of different species of cotton plants.

(2) The soft fibres, or bast fibres, including flax, hemp, and jute; flexible fibres of soft texture, 10 to 100 inches in length, composed of many overlapping cells, and borne in the inner bark of the plants.

(3) The hard, or leaf, fibres, including Manila, sisal, Mauritius, New Zealand fibres, and ixtle, all having rather stiff, woody fibres, 1 to 10 feet long, composed of numerous cells in bundles, borne in the tissues of the leaf or leaf-stem.

WEST INDIAN FRUIT.

CITRUS TRADE IN SICILY.

The following extracts from the *Consular Report* on Sicily for 1903 indicate the extent of the citrus fruit industry in the island. The items of export under this head include oranges and lemons, pickled fruit and peels, concentrated lemon juice, citric acid, citrate of lime, and essential oils:—

ORANGES AND LEMONS.

Messina.—The oranges and lemons exported in boxes from Messina during the years 1901, 1902, and 1903 amounted to 53,155, 53,815, and 19,342 tons respectively. The considerable decrease in the export is undoubtedly due to the fact that all the produce of the province of Catania which was formerly forwarded to Messina for shipment is now shipped direct from Catania. Moreover, several fruit merchants who were established at Messina are now transacting their business from Catania. In 1903, 7,076 tons were shipped from Messina to various ports in the United Kingdom. The total shipments of oranges and lemons in 1903 were 19,342 tons, as against 53,815 tons in 1902.

Palermo.—Of the total of over 100,000 tons of oranges and lemons exported, there were 84,436 tons of fresh lemons, 15,237 tons of fresh oranges, and 390 tons of pickled lemons.

Catania.—Exports of oranges and lemons: 1903, 83,953 tons valued at £430,530; 1902, 93,655 tons valued at £536,603.

Syracuse.—The number of boxes of lemons and oranges exported during the year was 70,928 for the United Kingdom and 242,091 for Austria-Hungary.

CITRIC ACID AND CITRATE OF LIME.

The production of citric acid in Sicily was estimated to be about 48 tons, calculated to be worth about £6,150.

Messina.—The quantity of citric acid exported in 1903 amounted to 45 tons, all of which was shipped to the United Kingdom.

Palermo.—Half the exports of citrate of lime went to the United Kingdom; 253 tons went to the United States.

PICKLED FRUIT AND PEEL.

Messina.—The export of citrons (halved) in brine amounted in 1903 to 2,160 tons, the quantity shipped to the United Kingdom being 1,065 tons.

Syracuse.—The total number of casks of pickled orange and lemon peel exported in 1903 was 8,258, of which 7,467 went to the United Kingdom and 791 to the United States of America.

The total quantity of bitter orange and lemon peel exported in 1903 was 7,582 tons.

BANANA INDUSTRY OF COSTA RICA.

The *Consular Report* on the trade of Costa Rica contains the following reference to the position of the banana industry:—

The total area under bananas is returned as 24,317 manzanas, or 42,060 acres, and this area is rapidly being extended under the stimulus of the increased price, 31c. gold for each bunch of 'firsts' all the year round, paid to the growers for their produce by the United Fruit Company, and of the excellent transport facilities afforded by the Costa Rica and Northern railways. The fruit from Costa Rica enjoys the highest reputation, and throughout 1903 has been shipped to Manchester fortnightly, some 650,000 bunches in all having been sold there, with very satisfactory results. The number of bunches exported in 1903 shows an increase of 23·11 per cent. on that in 1902. The following shows the growth of this trade during the past five years:—

1899, 2,962,771 bunches; 1900, 3,420,166 bunches; 1901, 3,870,156 bunches; 1902, 4,174,199 bunches; 1903, 5,139,063 bunches.

The United Fruit Company employs in this trade 4,000 Jamaicans, and during the past three and a half years has, with its associated companies, planted 16,303 acres of land with bananas. During 1903, 206 steamers have cleared for the United States ports with this fruit and twenty-five for the United Kingdom (Manchester).

INDIA RUBBER IN BAHIA.

The following reference to the collection of rubber is made in the *Consular Report* on the trade of Bahia:—

India rubber improved greatly during the past year. An increasing and steady demand from Europe caused the discovery of new sources of supply in the interior of this State.

Vast forests of Maniçoba, the existence of which was never suspected, were exploited and a grade of rubber supplied far superior to anything hitherto seen on the Bahia market. Prices appear to have been satisfactory to collectors, and had it not been for the scarcity of labour and the absence of proper roads and insufficient water supply for the pack mules, the arrivals would have been far greater.

I have seen samples of some specially well-cleaned and prepared Maniçoba which recently reached the market from one of the new districts, and this fetched from 3*s.* to 4*s.* per lb.

COTTON INDUSTRY.

West Indian Cotton.

The *Textile Mercury* of September 10, in a report of a meeting of the Executive Committee of the British Cotton-growing Association, has the following reference to the prospects of the industry in the West Indies:—

Sir Daniel Morris, the Imperial Commissioner of Agriculture for the West Indies, gave a short account of the prospects of cotton cultivation in the West Indies, expressing the opinion that the outlook was very bright, and the industry was now firmly established. He expressed great appreciation of the assistance which the Association had given. On the motion of the Chairman, the thanks of the Association were given to Sir Daniel Morris and his staff for their invaluable work in the establishment of cotton cultivation in the West Indies.

The following note is taken from the Manchester *Guardian* of August 27:—

Sir Daniel Morris, addressing the Burnley Chamber of Commerce last night, spoke hopefully of the prospects of substantially increasing the production of cotton in the West Indies. The fibre produced was of the best quality, and though it was impossible to rush the cultivation of new areas, the acreage was being greatly extended. He thought cotton would eventually be produced on such a scale there that Lancashire would be able to look to the West Indies for an appreciable amount of the cotton she required.

Prospects of Cotton Cultivation in St. Vincent.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, has forwarded the following brief report on the prospects of the industry in that island:—

The prospects of the cotton industry at St. Vincent look very well at present.

During the last three weeks I have seen a good deal of the cotton cultivations along the windward and leeward coasts. The cotton is being well cultivated, and the plants look strong and healthy. No disease of any importance has so far made its appearance.

The approximate area planted is 1,600 acres. The total will probably be higher when all the planting is completed, but I do not estimate that it will reach 2,000 acres as at first thought.

Several planters would have put in large cultivations had there been more labour available.

The total quantity of selected seed distributed by the Department amounted to 10,214 lb., sufficient to plant 1,702 acres. The quantity of other seed sown was small, not more, I should estimate, than 500 lb.

On the whole, should the weather be favourable, there is at this time every prospect of a good crop.

The last few days have been very wet, and one or two large fields I saw yesterday looked as if a few bright days would be of great benefit to the plants.

The Sea Island Cotton Crop of the United States.

In a review of the Sea Island cotton crop of 1904, the *Cotton Trade Journal* states that in many respects the crop was one of the most unsatisfactory for all middle-men in recent years. The planters, on the other hand, secured good prices.

The crop was 75,683 bales, against 105,955 last year, and 83,674 two years ago. The season opened with Fancy Georgias at 20c. Sea Island cotton advanced till about Christmas when Fancy Georgias were 30c. The next step was the selling in August at heavy losses. The close of the season finds Fancy Georgias offered at 20½c.

As to the new crop, reports vary. It appears that in South Georgia and Florida the acreage has been reduced. It is reported that the yield in South Carolina will probably be slightly more than 10,000 bags. Damage has been done to the crop by rains and insect and fungoid pests. The cotton worm is reported as troublesome on the Carolina islands.

'We conclude that the new crop will not exceed, if it even equals, the old crop of Sea Island cotton.'

Manuring Cotton in Egypt.

In the bulletin entitled 'Notes on Egyptian Agriculture,' reviewed in the *Agricultural News*, Vol. III, p. 299, Mr. Foaden deals fully with the subject of the manuring of cotton. The following is a summary of his observations:—

(1) The cotton crop is almost invariably manured and responds freely to the application of manures.

(2) Barnyard manure, or some manure of a similar nature, should form the basis of manuring in Egypt.

(3) Leguminous forage crops form an excellent preparation for a good cotton crop, but to obtain the best results the soil should be ploughed up some time before cotton planting takes place.

(4) The fullest advantage of the use of these manures, as well as of any chemical fertilizer that may be employed, can only be obtained when the soil is well prepared, deeply cultivated, and the crop judiciously watered during growth. Frequent hoeings also keep the crop in a gradually progressive condition.

(5) In addition to the use of barnyard manure at the rate of 10 or 15 tons per acre, applications of chemical fertilizers are attended with profit.

(6) Phosphoric acid, at the rate of 400 lb. per acre, applied in the form of soluble phosphate, gives excellent results. It tends to check excessive growth, increases the yield, improves the staple, and hastens maturity.

(7) A subsequent dressing of soluble nitrogenous manure is attended with excellent results. A good mixture in Egypt consists of about 125 lb. of nitrate of soda and about 50 lb. of sulphate of ammonia. Where larger quantities of barnyard manure are employed, it may be advisable to omit the latter. The soluble nitrogenous manure is best employed in two applications.

(8) Potash manures in Egypt have not given any increase in yield and their value is problematical. Their effect on the quality of the fibre has not been accurately determined.

Scale Insects and Fungi. The Victoria Department of Agriculture has recently issued a bulletin (No. 41) entitled 'Two New Fungi parasitic on Scale Insects.' Both new fungi belong to the genus *Microcera*, one being found on scale insects on Eucalypts in Tasmania, the other on the mussel scale on scrub boxwood in Victoria. Both fungi are first noticed when their bright pink fruits break through the scale. A very similar reddish fungus is frequently seen in the West Indies. On a rose tree in the Botanic Station, St. Lucia, hundreds of scale insects were recently noticed to be attacked.

SCIENCE NOTES.

Distribution of Essential Oils in Plants.

The *Pharmaceutical Journal* of August 6 has the following extract on the above subject:—

Continuing their investigations on the history of essential oils in plants, Charabot and Hèrbert state that after its formation in the green organs, chiefly the leaf, the essential oil is partly dissolved by the water which circulates in the plant. The chemical transformations which the terpene compounds undergo are such that the essential oil contained in the stem becomes less soluble than that contained in the leaf. The deduction is drawn that a portion of the odorous compounds migrates from the leaf towards the stem under the influence of the laws of diffusion. An examination of orange flowers and buds at different stages of growth leads the authors to think that the petals of the plant contain the greater portion of the essential oil of the flower, and contain also the greatest percentage proportion of oil. During the development of the flower, the essential oil becomes richer in esters of turpene alcohols, in methyl anthranilate, and in total alcohol. The ratio of the quality of combined alcohol to that of total alcohol increases; in other words, esterification is continued in the flower, but at a slow rate. The proportion of geraniol increases, and that of linalool decreases, so that the alcoholic mixture becomes richer in geraniol. (*Bulletin of Rouse-Bertrand Fils*, I, 9, 13.)

The Flowering of the Bamboo.

The bamboos form an interesting and important group of grasses, differing from other ordinary grasses in many ways. They are the giants among grasses, the erect sub-aerial stems of some species reaching a height of 120 feet, and a thickness of 12 inches. The floral structure also differs from that of ordinary grasses, the number of stamens in most species being six or more, while in other grasses (including the sugar-cane) it is usually three. Again, the fruit of some bamboos is a fleshy berry, while that of other grasses is a hard, dry grain or 'caryopsis.' The economic uses of bamboos in the East are too numerous to mention.

An interesting biological peculiarity of many larger bamboos is seen in their flowering. For several years the plants grow vegetatively without flowering, and then in one year the whole of them, at least all those in a district, will flower together: *Bambusa arundinacea*, for example, is said to flower every thirty-two years. A correspondent in *Nature* of September 1 gives some particulars with regard to this point, which is also dealt with at some length by Dr. (now Sir George) Watt in his *Dictionary of the Economic Products of India*. The curious point about it is that plants raised from cuttings always flower in the same year as the parent plant even though they may be only one year old. After flowering the bamboos usually die down.

It is still doubtful whether this gregarious flowering is really widespread or only local. It usually takes place in a dry season when other crops are poor, and the large quantity of bamboo seeds are used by the natives as food. As stated by Mr. Gamble in *Nature*, 'information on the subject is being gradually collected in India; the dates of flowering of the different species are, when observed by forest officers, recorded in their journal, the *Indian Forester*, and the behaviour of the clumps is being carefully watched, especially as the dying off of the clumps of a species over large areas may mean a serious dearth for several years of the most useful material for the construction of native houses and of many articles of common domestic use.'

Another point of discussion is as to whether the bamboo flowers when it attains a certain definite age (reckoned from the seed, so that cuttings are of the same age as the parent plant), or only at any period after it is mature when conditions are favourable. With regard to this point Dr. Watt says: 'Both may be true, and this is probably the wiser solution of the difficulty, that is to say, a bamboo may not flower before it has attained a certain age, but its flowering is not fixed so arbitrarily that it cannot be retarded or accelerated by climatic influences.'

Reference will be found in the *Agricultural News* (Vol. I, p. 39) to the flowering of a clump of bamboos in Grenada.

EXPERIMENTS IN ORCHARD CULTURE.

A series of experiments in orchard culture has been conducted at the Agricultural Experiment Station of Nebraska, of which an account is given in *Bulletin* No. 79. The following summary of conclusions is published for its general interest; but it must be clearly understood that the existence of winter is an all-important factor in these experiments which is absent in similar experiments in the West Indies:—

We may fairly say that the tests reported in this bulletin indicate the best all-round method of culture for young orchards to be thorough cultivation in early summer, followed by a cover crop in fall, so far as tests covering only a few years can prove any method best.

A mulch of straw is known to keep the soil moist during summer and it also protects tender roots in winter, but its use will surely increase winter injury to tender tops of trees by prolonging fall growth. Besides, a mulch induces shallow root development, which may result disastrously in later years, and its use is out of the question in large orchards.

Thorough cultivation protects trees against drought as well as mulching, and keeps the roots from forming near the surface of the ground. When cultivation is given in early summer, all that is necessary in order to furnish winter protection is to stop cultivating in midsummer, grow a cover crop (weeds being better than nothing) which will dry the ground in fall, causing the new wood growth to ripen early in preparation for winter and which will, by holding the snow or by matting down to form a mulch, protect tender roots during winter. Good cultivation in early summer can often be given young trees by growing some cultivated crop in the orchard. Tender crops are best since they can not be sown so early as to dry the ground seriously in spring and are killed by fall frosts, thus preventing very late drying. Cropping with corn, for instance, insures fairly thorough early cultivation, and corn is a fair substitute for a cover crop in fall and winter.

CULTIVATION OF MANILA HEMP.

The following notes on the cultivation of Manila hemp are extracted from *Farmer's Bulletin* No. 4 of the Philippine Bureau of Agriculture, 'Preliminary Report on the commercial fibres of the Philippines':—

Unlike many of the edible bananas, *Musa textilis* produces seed-bearing fruits. These seeds may be planted for the reproduction of new plants; but except where very extensive plantings are wanted, a better method is to plant the small suckers which spring from the root of the parent plant. After the plantation has reached its maturity and harvesting is in process, the old plants are cut near the roots, and the suckers are left to grow up. After the plants reach maturity, the crop is constantly renewing itself so that harvesting can go on almost continuously. The plant is in the best condition for producing fibre about the time the flower-bud reaches the top of the plant. The stalk is then cut as near the root as possible and the leaf-sheaths are stripped off. The fibre is the so-called fibro-vascular bundles which make up part of the structural substance of the leaf-sheath surrounding the flower-stem from the ground to the expansion of the leaves. The length of the leaf-sheath determines to some extent the length of the fibre. This leaf-sheath is thicker along the centre than it is at the sides, and in order to facilitate the stripping of the fibre it is split longitudinally into strips 2 to 3 inches wide. The strips from the thicker portion of the sheath are then torn tangentially, inasmuch as the fibre is contained mainly in the outer part of the sheath, and the inner portion of the thick strips which are torn off consist mainly of the valueless pulp.

EXTRACTION OF FIBRE.

For stripping the fibre the method almost universally in use is to draw these prepared strips between the edge of a knife or 'bolo' and a hard, smooth block. The apparatus can be set up at frequent intervals in the vicinity of the plants to be cut. A nipa shed is constructed, though sometimes the protection and shade of a large tree is chosen. To two uprights set in the ground, a horizontal pole is attached with 'bejucos' or rattan canes. A short, strong knife or 'bolo' with a wooden handle is firmly attached on a pivot or fulcrum upon the upper surface of the horizontal pole. The handle is attached by a rattan cane to a bamboo spring arranged in the roof of the shed, or to a branch of the tree, while another rattan cane runs from the handle to a treadle on the ground, which can be worked by the foot of the operator. The spring in the roof above holds the knife upon the pole or, in some cases, a block, with a uniform pressure, while the strip of the leaf sheath is being drawn between its edge and the pole or block. By placing the foot upon the treadle the pressure is released and the fibre may be redrawn or a new strip inserted.

When it is not the desire of the operator to produce a fibre of fine texture and white colour, a knife with finely serrated edge may be used. By using a knife of this kind there is less waste of the fibre, but at the same time more of the undesirable pulp and, consequently, fresh juice is left with the fibre. This residue of pulp and juice drying upon the fibre gives it an undesirable colour, and if too much is left on, the strength of the fibre is injured and the market value is much reduced. The whitest fibre is drawn under a knife with a smooth edge and immediately after the plant is cut. If the stalks and strips are allowed to lie in the sun for any length of time before the fibre is drawn, the fibre will be coloured more or less yellow. As a means of increasing the fineness and whiteness of the fibre the strips may be drawn several times when they are fresh. Of course, the greater the number of times the fibre is drawn and the greater the pressure upon the knife, the more is the waste; but the increased value of white fibre will compensate for a certain amount of waste.

In yield *Musa textilis* varies considerably. In Albay, Sorsogon, and Masbate, where the rainfall is heavy and the humidity of the atmosphere is high, the yield ranges from 12 to 16 piculs of dry fibre per hectare each year (687·5 to 967·6 lb. per acre). In other provinces where the climate is drier the yield may not exceed 6 piculs per hectare. In some localities the quality of the fibre is injured by the work of borers. Wherever these insects work the fibre is either cut entirely or it is injured in colour and strength.

Several attempts have been made to perfect machines for extracting this fibre economically, but these machines have either fallen far short of their requirements or have not met with favour among the natives who have had occasion to use them. The most essential feature at the present time of a machine for this work is that it be light and portable. The greater part of Manila hemp is produced on the mountain or volcano sides or on very rough ground, and as the plant stalks are quite heavy, all planters have found it most economical to transport their apparatus rather than the material. It is hoped, however, that some apparatus can be devised to avoid the great waste which renders the present method objectionable. It is variously estimated that from 20 to 30 per cent. of the fibre is wasted by this crude process of drawing, and this fibre, too, is fine and of good quality. The thought is at once suggested that this waste fibre might be used as a paper stock if it is not too much injured by the juice and pulp with which it is mixed, and if it can be economically separated from them. This is a line of investigations which will be subsequently taken up.

CLASSIFICATION AND USES.

For commercial purposes the fibre is classified into several groups according to colour, texture, and strength. Length plays a less important part in the commercial grades. The great lightness, combined with strength, is the characteristic of this fibre which gives it its great value. The qualities usually recognized are the superior, current, second, and red. Then there are numerous gradations in each of these groups. The fibre for export is usually tied in small wisps or hanks, and these are put up in bales weighing 2 piculs (275 lb.).

In all countries to which this fibre is exported the greater part of it is used for cordage and ropes. In the United States immense quantities are made into binder twine, and because of its lightness, strength, and comparative durability, it is very serviceable for ship's ropes and cables. From old and disintegrated ropes our valuable Manila paper is made. In the Philippines the finer qualities are used in the manufacture of textile fabrics. Throughout the entire archipelago these weavings are worn extensively by both men and women, and when the fibre is mixed with cotton a durable fabric is produced which is well adapted to the climatic conditions of the islands. It is believed that the demand for the better qualities of these fabrics will increase in the United States and Europe. A small use is made of the fibre in upholstery, packing, and brush making.

For observations on the prospect of establishing an industry in Manila hemp outside the Philippines readers are referred to the *Agricultural News* (Vol. III, p. 201).

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 319 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, OCTOBER 8, 1904. No. 65.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial of this issue deals with the sisal hemp industry. There has been marked progress in this industry in the Bahamas and the Caicos Islands during recent years.

On p. 322 we publish information relating to the Trinidad cane-farming industry. The account of experiments with varieties of the sugar-cane in Mauritius is also of interest.

Our cotton notes include a brief review of the prospects of the cotton industry in St. Vincent, and a note on the Sea Island cotton crop of the United States. The summary of conclusions as to manurial experiments with cotton in Egypt is likely to be of interest as serving as a basis for similar experiments in the West Indies.

An article on the cultivation of Manila hemp in the Philippines is published on p. 327.

In our 'Insect Notes' a warning with reference to the cotton worm is inserted, to which we desire to draw the attention of all cotton growers.

From the extracts from the report of the Inspector of Schools at St. Lucia, it will be seen that considerable progress is being made in agricultural education, more especially in connexion with school gardens.

Under the heading 'Department Reports' on p. 232, will be found short reviews of two reports recently published by this Department. With the issue of these two reports the publication of the annual reports on the Botanic Stations in the West Indies is completed.

Shipment of Bananas from Barbados.

At a meeting of the Barbados Agricultural Society, held on September 30, a discussion took place on the subject of the shipment of bananas. On the motion of the Hon. F. M. Alleyne, the following resolution was passed:—

'That the Hall system of cold storage having been instituted on the "Trent" and "Tagus," and having so far proved entirely satisfactory for the safe carriage of bananas, the Barbados Agricultural Society trust that the Royal Mail Steam Packet Company will see their way to establish the same system of cold storage on their other ships.'

In the course of the discussion it was mentioned that, while hardly a single bunch had been lost when shipments had been made by the ships in which the system had been installed, shipments by the other steamers of the company had not proved satisfactory during the recent hot season. It was understood that the company had fitted up the steamers mentioned by way of experiment and that the system would be extended to the other ships as soon as it had proved successful. The society therefore desired to urge the company to do this with as little delay as possible.

Cotton Growing in Jamaica.

From newspapers to hand by last mail it is apparent that in Jamaica considerable interest is being taken in cotton growing. The Board of Agriculture and the Agricultural Society are giving every encouragement and much assistance. Several meetings have recently been held at which useful addresses on cotton growing have been given.

Special encouragement is being given to this cultivation in the dry district of Vere. Here several planters have conducted experiments with such a measure of success that they have decided to carry on the cultivation upon a fairly large scale. At one of the meetings referred to the Hon. H. T. Ronaldson gave his experiences in a 1-acre experiment plot. The result was eminently satisfactory: he sold the seed-cotton for £7 and succeeded in netting £5 from the acre within six months.

In another dry district of the island, where new crops to take the place, to some extent, of cane were urgently required, viz., St. James, Mr. Shore, a member of the Board of Agriculture, has, it is reported, succeeded in obtaining 400 lb. of lint cotton from $\frac{8}{10}$ acre.

Messrs. Elder Dempster & Co., anxious to do all in their power to make cotton growing a success, have agreed to carry cotton freight-free until further notice. The Hon. T. H. Sharp has announced that he will purchase, locally, ginned or unginned cotton, while Mr. J. H. Levy is prepared to deal similarly with cotton grown in St. Ann, and Mr. C. G. Farquharson will buy cotton at Black River.

The Jamaica *Daily Telegraph* closes a leading article on the subject of cotton growing with the following remarks: 'The conditions are all favourable and it would be a pity if this splendid opportunity were lost.'

Cotton and other Crops in Sierra Leone.

The recently issued *Colonial Report* on Sierra Leone devotes considerable attention to the subject of cotton growing. An indigenous variety grows freely without any attempt at cultivation, the product being spun into excellent cloths. Every encouragement is being given by the Government to those who are interesting themselves in the growing of cotton. At first experiments were made to introduce exotic varieties, but it is apparently considered that native varieties, if improved by selection, will prove more successful on account of the difficulties of acclimatization. Experimental farms have been started by experts from the Southern States of America. There is a large area, within easy reach of rail and water, in which cotton might with advantage be cultivated.

The principal staples of the colony are palm oil and palm kernels, kola nuts, and rubber.

The exports of rubber have declined very considerably during the past eight years. The Government is encouraging the efforts at present being made by individuals to produce rubber, especially by experimental plantations. Sierra Leone rubber (from *Landolphia owariensis*) realized, in October 1903, 3*s.* 8*d.* per lb., which is 1*s.* more than at the corresponding period of the previous year.

Indian Bees'-wax.

A recent issue of the *Agricultural Ledger* (1904, no. 7) is devoted to 'an account of the sources, preparation, trade, and composition of the bees'-wax of British India.'

Indian bees'-wax is derived from three species of the genus *Apis*, the waxes prepared from the three species being practically identical in composition. The wax is seldom adulterated for fraudulent purposes. Its preparation is a very simple operation, as it is usually collected by almost wild tribes from trees and rocks. The honey is squeezed by the hand from the wax, which is then washed in cold water before being heated in water over an open fire. The melting wax rises to the surface and the impurities sink to the bottom of the vessel. If necessary the wax is strained through a piece of coarse cloth. In some districts peculiar methods are adopted for purifying and clarifying the wax, cow-dung, tamarind leaves, and salt being among the agents employed.

The annual exports of bees'-wax from the whole of India during the last few years have amounted to 4,000 to 5,000 cwt. The trade has remained almost stationary for the past twenty years, but is undoubtedly capable of great expansion.

In concluding his paper the writer refers to the successful results that have followed the attention given to apiculture in the West Indies. 'During the ten years 1888-98 the value of bees'-wax exported has increased from £4,823 to £10,389. Some share of this increase is no doubt due to the intelligent action of the Jamaica Agricultural Society. . . Another feature of success is the high-class quality of the wax sent to the London market and the consequently good prices realized.'

Agriculture in the Hawaiian Islands.

The *Consular Report* on the Trade of Hawaii states that the export of raw sugar during the year ended June 30, 1903, amounted to 387,412 tons, valued at £5,220,187, all of which went to the United States. In comparison with this the other items of export (consisting of coffee, fresh fruits, hides and skins, honey, rice, etc.) were insignificant. The production of sugar has steadily increased during the last three years. For some time past the price of sugar has been low, but the recent improvement in prices has been a source of satisfaction to growers and merchants. The new pest, known as the 'leaf hopper,' has proved very destructive.

In consequence of the recommendation of a protective duty, to enable coffee planters to compete with Brazilian imports into the United States, the larger coffee plantations have continued cultivation. But smaller growers have been discouraged by the poor prices. There was a considerable increase in the output.

The cultivation of sisal hemp has received an impetus owing to the satisfactory prices obtainable at San Francisco. Hitherto, the difficulty has been to obtain a market for this product.

The exports of honey were valued at £3,121, and those of fresh fruit at £13,690.

The Development of West Africa.

A series of interesting articles on the above subject has recently been published in the *Syren and Shipping*. Reference is made to the need of encouraging agricultural industries and more especially that of cotton growing. Of the British Cotton-growing Association it is stated: 'So far the work of the Association has progressed, the most ample and conclusive evidence has been forthcoming that, in the development of West Africa, cotton growing is destined to rank as the foremost industry.' The Association is encouraged, from the samples already received, to believe that the most suitable cotton for Lancashire may ultimately be obtained from native seed or from a cross between native and American.

In Lagos an Agricultural Society has been formed, which already has 400 members. The British Cotton-growing Association is to conduct a model farm for the purpose of demonstrating to the natives approved methods of cultivation.

In Sierra Leone, too, encouragement is being given to the natives to take up the cultivation of cotton. An expert who recently visited the colony has advised a large scale of operations, and this is being established.

With regard to Liberia, it is stated that it seems destined to rival, if not to surpass, the Congo Free State in the extent and value of its rubber resources. There is every prospect, also, of great progress in the cacao industry. Cotton growing is also receiving attention.

In Southern Nigeria 'the cultivation of cotton gives the greatest promise of any of the local industries.' The forest resources of the colony are also being exploited.

INSECT NOTES.

The Cotton Worm.

Reports have been received that the cotton worm has made its appearance in fields of young cotton. We have repeatedly urged in the *Agricultural News* the need for a careful look-out being kept for this pest. We would further urge planters to communicate with the local officers of the Department immediately on the appearance of the worm if they are in any doubts as to the methods of treatment to be employed. It is absolutely necessary that prompt action be taken if this pest is to be successfully dealt with.

Ants on Fruit Trees.

A planter in Dominica has experienced trouble from ants infesting blossoming orange trees. He states that in some cases they swarm the blossoms and ultimately destroy the young fruits.

The most effective treatment in such cases would be to treat the nests with carbon bisulphide if they can be located. An alternative treatment is to band the trees with any sticky mixture which would prevent the ants from climbing the trunks, especially if it contained kerosene oil or other substance which ants will not cross. Kerosene emulsion (stock solution) applied with a brush over 2 or 3 feet of the trunk should serve the purpose.

Montserrat.

The following extracts are taken from a report by Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, upon a visit paid by him to Montserrat in July last:—

The plants at Grove Station were inspected and were found in excellent condition as far as pests were concerned. A wild cotton tree, a few citrus plants in the nursery, and a *Tabernaemontana* were more or less infested with scales. These were taken out and burned.

On account of the dry weather that had prevailed but few crops were being grown. Land was being prepared for cotton and a small amount of seed had already been put in. The cotton worm is not much dreaded as a pest, as the supply of Paris green on hand in the island is believed to be sufficient to meet the needs of this year's crop.

The experiments tried at Dagenham with various insecticides indicate that the leaf-blister mite can be controlled by the use of sulphur. Sulphur and water seem to give the best results, without harm to the plants. The application of dry sulphur and lime is much cheaper, however, and gives very good results, although it is likely to cause a slight scorching of the leaves. It seems probable that the use of sulphur and dry air-slaked lime will check the development of the leaf-blister mite sufficiently to allow the production of good crops of cotton.

The most serious menace to the cotton crop at present is the black boll or boll rot. This is probably a vegetable organism and attacks the bolls in all situations, under the greatest variety of conditions of location, soil, growth, and season.

I visited several of the lime plantations of the Montserrat Lime Co., and found that spraying had been practised to some extent, in some cases with good results. In other cases, however, the trees sprayed were old, and rather badly infested; the improvement in such cases was not marked. I suggested the desirability of spraying young trees and attempting to keep them from serious infestation, and this will be tried on a fairly large scale. It would seem that this would be both practicable and effective.

I saw several fields in which Bengal beans had been planted and allowed to climb over the lime trees. These beans grow so vigorously as to cover the tree completely, and yet trees which had been so covered were vigorous and comparatively free from scales, while I was informed that previous to the planting of the Bengal beans they had been badly infested. If this practice is always successful, it would seem to be a good one to follow, as the growth of such a vigorous leguminous crop must result in the fixation of a large amount of nitrogen, and the roots and vines thus furnish a large amount of valuable manure.

SWEET POTATOS AS A STOCK FOOD.

The New South Wales *Agricultural Journal* for August has an article on the cultivation of sweet potatos, which, it is stated, are not cultivated in that State as extensively as they deserve to be. In New South Wales the sweet potato has proved a splendid drought resister. The following note on its use as a stock food is of interest:—

In addition to the value of the roots as a vegetable, they are also a valuable stock food, and the vines make an excellent cattle food. The roots have a slightly higher feeding value than common potatos, but like them are fat, heat, and energy producing rather than flesh forming. Pigs are very fond of the succulent roots and can harvest them without difficulty or assistance. It is said that they keep the kidneys and bowels in good order and so ward off disease. Pig farmers who have poor sandy land would do well to consider the advisability of raising this crop extensively in place of maize for fattening. It is estimated that it requires $4\frac{1}{2}$ bushels of sweet potatos to equal 1 bushel of maize grain in feeding value. But much sandy soil which does not produce 1 ton of maize could be made, with little trouble, to produce 5 or 6 tons of sweet potatos.

Duggar, in the United States Department of Agriculture *Farmers' Bulletin* no. 26, 'Sweet Potatos: Culture and Uses,' gives the average percentage composition of the roots as follows, and discusses the relative food values of corn and sweet potatos:—

Water	...	...	...	69·32	to	73·11
Ash	...	...	...	1·09	„	1·29
Protein	...	...	...	1·38	„	2·47
Fibre	...	...	...	0·86	„	1·23
Starch, etc	...	...	...	22·73	„	28·46
Fat	...	...	...	0·43	„	0·85

Three pounds of sweet potatos afford almost as much dry matter, quite as much carbonaceous material, but less than half as much protein, as is contained in 1 lb. of corn. By using $\frac{1}{2}$ lb. of cotton seed meal or 1 lb. of cow peas (seed) for every 10 lb. of sweet potatos, this deficiency in protein is fully supplied.

EDUCATIONAL.

St. Lucia.

In the annual report of the Inspector of Schools at St. Lucia considerable space is devoted to the subject of agricultural instruction and school gardens. Mr. Bundy reports as follows :—

The formation of School Gardens in 1903 was taken up with great zeal and success by teachers in most parts of the island. The district of Anse-la-Raye and Canaries is now the only one in which no school garden is to be found, each of the other districts having at least two.

During the year the Government made special grants out of the grant-in-aid to primary schools for tools for school gardens. Sixteen complete sets, including spades, forks, hoes, sieves, watering pots, trowels, pruning knives, lines, etc., were purchased in Barbados and England and distributed. Unfortunately, the vote becoming exhausted, no further assistance was possible.

In July 1903, twenty-five teachers went into residence at the Union Agricultural School and passed a fortnight there receiving lectures and practical illustrations on agricultural subjects from the Curator and Agricultural Instructor. The experiment proved to be a great success. The teachers were boarded and lodged at the expense of the local Government, the Imperial Department of Agriculture affording the instruction and all assistance.

A grant of seed to the various schools was also made by the Imperial Department, and I was greatly indebted to the Curator for the assistance afforded by him in making out lists of various tools suitable for school gardens.

Altogether a very satisfactory beginning has been made in the direction of practical agricultural teaching in our schools. The agricultural work done, is not only, nor principally, confined to work in the school gardens. Demonstrations and object-lessons on agricultural subjects form a regular part of the ordinary school work, and there has been a real awakening of interest both among teachers and scholars.

In an appendix Mr. Bundy reports fully on school gardens in the island. From this it appears that only six schools are now without gardens. Notes are given on twenty-three gardens. In most cases the work done is reported as very satisfactory, the gardens being well kept and serving as useful object-lessons to the neighbouring peasantry.

Nature Teaching.

At the present time many of the teachers in the West Indies have attended lectures on some of the elementary scientific principles underlying local agriculture and have passed the examinations on those lectures. All this is of course a beginning and has always been intended as a mental stimulus to the teacher and not in any degree as the end of the matter. Only those teachers who are continually improving themselves and their teaching can hope to attain any great measure of success in nature teaching in the schools. On this subject we reproduce the following paragraph from *The Teaching Botanist*, by Professor W. F. Ganong, (pp. 51-2):—

Many of the qualities essential to good botanical teaching are, of course, the same as are needed for success in any teaching; these are the qualities constituting the teaching temperament. This consists in a deep-seated pleasure in the exercise of guiding minds from ignorance to knowledge and in seeing the light dawn through darkness; in a power of positive self-reliant leadership; in ability to project one's self into the student's mental position; and in a personality that can win respect and affection. Of all these characteristics, sympathy is one of the most important; for the good teacher is, first of all, a mental physician of the truest sort, diagnosing each individual case, and fitting its proper treatment to it. He is a leader and not a driver. He is always an uncompromising though genial critic, using sarcasm only for otherwise incorrigible cases. He diplomatically makes use of all devices for arousing interest and holding attention. Especially is he ever investigating, experimenting and improving in his teaching, reading newer books upon it, and keeping in touch with educational progress as shown in the educational journals. It is, indeed, only by constant advance that he can escape that mental drying up, which is the greatest danger, and too often the most obvious badge, of the teaching profession. And he has a deep respect for his profession, views it as his life work, and upon every possible occasion champions its interests.

POULTRY NOTES.

The *Journal of the Jamaica Agricultural Society* for September 1904 publishes some interesting notes on preparing poultry for the table, from which we make the following extracts :—

No fowl should appear on the table until it has gone through a process of fattening. Even this is not understood. A few fowls are crammed in a dark, dirty coop, or a cage exposed to all weathers, sun or rain, a handful of corn is flung in twice a day, water is forgotten, and the fowls are thinner and bonier, if not diseased, when the putting up process is over and they are taken out to be killed. A well-fed, properly-fatted fowl, fasted for twenty-four hours with plenty of water given the while, killed and hung for twelve hours in a cool place or as long as the climate allows, is one that will make a good and delicate meal for four or five people.

Every fowl which is intended for killing should be kept twenty-four hours without food before being killed, but it may have water. Thirty-six hours fasting will not hurt them, if they have plenty of water to drink. This may appear cruel to some people, but we do not think it is in the least so. Animals, birds, and even human beings, can go without food much better than they can drinking water, at any time. When a hen is made to fast in this way before being killed the flesh is so much nicer, and the owner is able to keep the bird much longer before cooking it. If an animal is kept without food in the same way before being killed, the meat is always better.

There is more flavour in a hen when she is eighteen months old than there is in a chicken three months old, and a hen four years of age is as good as one eighteen months old if it is cooked properly. If meant for breakfast an old fowl should be killed over-night if possible; if for dinner, it should be killed in the early morning and hung in the safe wrapped in the leaves of the papaw. There will be no taint in twelve hours if the safe is in a cool place, as all safes ought to be. They always require boiling a little longer in very hot weather, as they cannot be kept long enough, but when they are killed between October and January they may be kept easily for two or three days. Old hens, when they are cooked properly, are a great luxury.

GLEANINGS.

The exports of divi-divi from Maracaibo in 1903 were valued at £7,500. (*Consular Report* on Caracas.)

Sir Robert Llewelyn will be asked on his next visit to acquire more land under the Land Settlement Scheme for the settlement of small holders. (St. Vincent *Times*.)

Mr. A. J. Jordan reports that at Montserrat the cotton sown during the first two weeks of September has made good growth and that the earlier-sown cotton is flowering freely.

According to the Montserrat *Herald*, there are prospects of a trade being worked up in sulphur from the local Soufrière. It is reported that the sulphur will be partially refined before exportation.

The St. Vincent *Government Gazette* publishes the terms of an Ordinance 'to interdict the sale of cotton without a certificate, and for more effectually preventing the purchase and exportation of stolen cotton.'

The committee appointed by the Texas Legislature to investigate methods for the extermination of the boll weevil and pay a reward of £10,000 to the discoverer of any such method, has decided, says *Science*, that no one has earned this reward. (*Nature*.)

The *Journal of the Jamaica Agricultural Society* urges the need for greater care in the picking and packing of fruits. Although there has been a notable improvement of late years, there is still room for further advancement in this direction. It has been shown that the citrus industry can be made to pay in Jamaica, but before shippers can hope to participate in the success, slip-shod methods must be abandoned.

Last year Mr. Dunn, Superintendent of the Botanical Department, Hongkong, visited Weihaiwei to report on its agricultural possibilities. He is of opinion that Weihaiwei would make an excellent centre for the cultivation of silk, the growing of fruit, the establishment of vineyards, and the establishment of a trade in bean cake and white wax. (*Colonial Report* on Weihaiwei, 1903.)

Egyptian cotton, grown by settlers on the Pedro Plains and ginned by Mr. Fursdon at Hartlands, resulted as follows:—Gross weight, 428 lb.; lint, 158 lb.; seed, 263 lb.; loss in ginning, 7 lb. Some of this cotton looked to have been picked before it was fit and had not been kept clean, and thus there may be a loss in value. Carefulness in picking and keeping cotton clean is everything. (*Journal of the Jamaica Agricultural Society*.)

During the fortnight ended September 8, 202 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West Indian, 4·25*d*. to 8*d*.; West Indian Sea Island, medium fine, 13*d*.; fine, 14*d*.; extra fine, 16*d*. per lb. (*West India Committee Circular*.)

According to the *Chamber of Commerce Journal*, the cultivation of peppers has extended rapidly in French Indo-China during the last few years, and has now become an important and prosperous industry. The exports amounted to 3,423 tons in 1902. The industry is largely in the hands of natives.

In forwarding a report by the Agricultural Superintendent on the lectures recently given in St. Vincent in connexion with the cotton industry, the Acting Administrator has written that the lectures have been a distinct success, and has expressed the wish that a second series shall be delivered at the approach of the next bearing and picking season.

In his annual report the Magistrate of the Second and Third Districts of St. Lucia states that the cacao crop was abundant—due largely to a satisfactory season. Mr. Palmer reports that this is also partly to be attributed to improved methods of cultivation which have been adopted by the planters, and which have been to some extent copied by neighbouring peasants.

Reporting upon a sample of tamarinds sent to the Imperial Institute from Northern Nigeria, Professor Dunstan states: 'The demand for tamarinds in this country is at present supplied almost entirely by the West Indies, whence they are exported whole, preserved in syrup. The present value of West Indian tamarinds varies from 7*s*. 6*d*. to 11*s*. 6*d*. per cwt., according to quality.'

The St. Croix *Avis*, in reproducing our recent editorial on wind-breaks (*Agricultural News*, Vol. III, p. 273), refers to galba thus: 'We have never heard it called "galba" here, but we believe it is known as "bastard mahogany."' According to Baron Eggers (*Flora of St. Croix and the Virgin Islands*), galba is known as 'Santa Maria,' while 'bastard mahogany' is the local name for *Andira inermis*, a leguminous tree known as the 'cabbage-bark tree.'

Mr. J. H. Hart, F.L.S., writes: 'In view of the note on date palms in India in the *Agricultural News* (Vol. III, p. 295), it may be interesting to state that all our trees in Trinidad ripened all the fruit set, and this actually during the wet season (August). I find it best to cut the fruit when "full" and allow it to ripen under cover, as birds carry them off as fast as they ripen if left upon the trees. A heavy shower readily detaches and destroys any ripe fruit.'

The *Botanisches Centralblatt* of September 6, gives an abstract of a paper by Professor E. Laurent on a new type of plant disease which he calls fatty degeneration (dégénérescence graisseuse). The disease appeared on the leaves of palms in greenhouses as yellowish spots which later turned brown in the centre. In the parenchyma cells there were found spherical refractive bodies of various size, which were darkened by osmic acid. These oily bodies are supposed to be degeneration products of the chloroplasts. The disease is apparently due to physiological causes, chiefly too much moisture and a low temperature.

ANTIGUA: REPORTS ON THE BOTANIC STATION, ECONOMIC EXPERIMENTS, AND AGRICULTURAL EDUCATION, 1903-4.

Botanic Station.—In the absence on leave of Mr. W. N. Sands during part of the year and after his removal to St. Vincent, the duties of the curatorship were discharged by Mr. A. H. Kirby, B.A., Agricultural and Science Master.

There was a slight increase in the number of economic plants distributed from the station. The work of raising seedling canes was continued. A supply of plants was furnished for planting in connexion with the Arbor Day celebrations.

The season appears to have been an unusually favourable one, the rainfall for the year being 7·80 inches greater than in the previous year and 16·33 inches greater than the average for the past thirty years.

Economic Experiments.—Experiments were carried on at Scott's Hill and Skerrett's with a large variety of economic plants. In the case of the experiments with sweet potatos, largely increased yields were obtained. The experiments with new varieties of corn were continued.

This report contains an interesting and comprehensive review of the cotton experiments. In all, nearly 600 acres were planted. Insect pests, especially the cotton worm, proved very troublesome. Mr. Sands rendered valuable assistance to planters in advising them as to methods of suppression. The Central Factory, opened in December last, has three gins and a baling press: already 150 bales, of 180 lb. each, have been sent out.

Agricultural Education.—From the report of the Agricultural and Science Master it appears that full advantage is being taken of Mr. Kirby's services.

In addition to his work at the Grammar School, he has given instruction at the Girls' High School and at the Female Training College. Mr. Kirby also gave a series of lectures to elementary school teachers.

GRENADA: REPORTS ON THE BOTANIC STATION AND EXPERIMENT PLOTS, 1903-4.

Botanic Station.—The expenditure for the year was £570 18*s.* The proceeds of the sale of plants, fruit, etc., amounted to £44 19*s.* 9*d.*

The rainfall for the year was 82·40 inches.

There was a falling off in the number of plants distributed from the station. Satisfactory results appear to have been obtained in the experiment plots attached to the station, especially in the case of onions.

Experiment Plots.—Experiments with cacao were carried on at four plots, while a plot each was devoted to pine-apples and grape vines. The report of the Acting Agricultural Instructor deals with the working of these four plots. On the whole, good results were obtained from the cacao plots, especially those at Vendome and Colombier.

In the manurial plots basic slag and sulphate of potash have given the best returns.

BELGIAN HARES.

The following note on Belgian hares is taken from the *Journal of the Jamaica Agricultural Society* for September. In view of Mr. Barclay's recommendation of this breed for the West Indies in his notes on rabbit keeping, this description is of interest. Further particulars as to Belgian hares, their characteristics, cost, etc., will be found in the *Agricultural News* (Vol. III, p. 230):—

A good many who write us about rabbits are very hazy as to what the animal called Belgian hare is. It has no connexion whatever with the hare of the fields of Great Britain or true hares anywhere. It is a large breed of rabbit, simply that, and it is a large and fine breed because it has been taken up by skilful breeders, more than any other breed, and carefully bred; and then it became the subject of a particular fad in the United States when fabulous prices were paid for pairs corresponding to the best type laid down at shows. It is of a medium size and active and suits our conditions here, and with those who have kept it the Belgian hare is a great favourite. It will be as well to give the standard points of the breed:—

Colour.—Rich rufus-red, carried well down sides and hind quarters, and as little white under jaws as possible—20 points.

Shape.—Body long, thin, well tucked-up flank, and well ribbed-up back, slightly arched, loins well rounded, head rather lengthy, muscular chest; tail straight, not screwed; altogether of a racy appearance and free from white bars, feet well coloured—20 points.

Ticking.—Of a rather wavy appearance and plentiful—10 points.

Ears.—About 4 inches, well-laced tips—10 points.

Eye.—Hazel colour, large, round, bright, and bold—10 points.

Legs and Feet.—Fore feet and legs long, straight and slender, well coloured—10 points.

Size.—About 8 lb.—5 points.

The breed is perfectly hardy, well suited for being kept here either on the hutch system or on the Morant system. The does are prolific and good nurses, and those with plenty of green food on hand may do far worse than go in for breeding a few of these animals for their table.

To breed them one of the largest, good-sized hutches must be used to enable the occupant to take plenty of exercise, but according to their size they are perhaps the smallest eaters of any kind of rabbit.

DEPARTMENT NEWS.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, returned to Barbados in the S. S. 'Oruro' on Thursday, September 29. While in St. Lucia, Mr. Ballou visited all parts of the island in connexion with the advancement of the cotton industry and addressed a meeting of the St. Lucia Agricultural Society on Monday, September 26. Mr. Ballou also took part in two of the lantern lectures on cotton growing.

Mr. George S. Hudson, Agricultural Instructor at St. Lucia, returned from leave of absence by the R.M.S. 'Atrato,' and resumed the duties of his office on Tuesday, September 27.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

Mr. J. R. Jackson, A.L.S., has forwarded the following report on the London drug and spice markets for the month of August :—

Considering that we are still in the midst of the holiday season, it is satisfactory to note that in the produce markets generally a fair trade has been done during the month of August. Neither in drugs nor spices were any markets held in the first week of the month, the August bank holiday falling in that week.

GINGER.

At the first dealing in this spice about 550 packages of Jamaica sold at steady rates ; good washed realizing 43*s.* 6*d.* to 47*s.* 6*d.* ; middling to fair washed, 37*s.* to 40*s.* ; ordinary dullish, 34*s.* to 35*s.*, ordinary small and ordinary, 29*s.* to 31*s.* per cwt. Cochin was bought in, bold native cut at 40*s.* and Bengal at 19*s.* A week later there was a moderate supply of Jamaica offered, part of which sold at steady prices, good fetching 43*s.* to 45*s.* 6*d.*, fair washed, 39*s.*; middling, 35*s.*; ordinary to ordinary dullish, 30*s.* to 33*s.*; and common, 27*s.* Cochin was again mostly bought in at the following rates :— Good bold selected, 65*s.*; medium and bold, 49*s.*; and small medium and bold, 38*s.* In the following week, viz., on August 24, the large quantity of over 1,000 packages of Jamaica were offered and 200 disposed of at auction, further sales being afterwards made privately : the prices quoted were as follows :—Good washed, 46*s.* to 47*s.* 6*d.* ; fair washed, 37*s.* 6*d.* ; ordinary to middling dullish, 33*s.* to 36*s.* Sixty-nine cases of Cochin were also offered at this sale, 57 being sold, including small medium cut, mouldy, at 28*s.* 6*d.* From these figures it will be seen that the Jamaica product is still to the fore in quantity and price.

NUTMEGS, MACE AND PIMENTO.

At the first sale West Indian nutmegs were in good supply, 486 packages being offered and sold at steady prices, but at a slight increase on those of the previous month. But little or no change took place at the remaining sales.

The same may be said of West Indian mace, which at the last sale, on the 24th., fetched 1*s.* 8*d.* for fine pale, 1*s.* 4*d.* to 1*s.* 5*d.* for fair, and 1*s* 2*d.* to 1*s.* 3*d.* for ordinary ; 53 packages of West Indian being disposed of.

Of pimento, 558 packages were offered at the first auction and bought in at rates from $2\frac{3}{4}d.$ to $2\frac{7}{8}d.$ For the remainder of the month little or no change occurred in prices and there continued a fair demand.

ARROWROOT.

Arrowroot, which is always offered at the spice sales, began with the offering of 100 tins of St. Vincent, which were bought in at 3*d.* per ℔. On the 24th. some 500 barrels of St. Vincent were offered and again bought in. In connexion with the imports and deliveries of arrowroot, the following note has been published, giving the quantities in the first seven months of 1904 and the stocks on July 31 :—

Imported, 11,485 barrels, 807 boxes and tins ; delivered, 12,905 barrels and 714 tins; stocks, 11,216 barrels, 1,159 boxes and tins.

Our well-informed contemporary, the *Chemist and Druggist*, gives the following note on Bermuda arrowroot:—

'The export of arrowroot from Bermuda during 1903 amounted to 9 tons 9 cwt., valued at £1,300, against 11 tons 12 cwt. exported in 1902, valued at £1,347. This return points to a rise in the price of the Bermuda variety. There is one arrowroot factory in the island, which is equipped with modern plant and is capable of producing a large quantity of this valuable article. The arrowroot manufactured in the colony is being placed on the markets at the present date in attractive packages and in small quantities, with distinctive labels as to origin, and it is expected that the demand for this product will materially increase.'

SARSAPARILLA.

With regard to this drug, the same paper from which we have quoted the above paragraph had the following note in its issue for August 6 : 'There is a good inquiry for grey Jamaica but very little is obtainable. The exports of sarsaparilla from Guatemala during 1903 amounted in value to £417 compared with £430 for 1902. The British Vice-Consul at Livingston (Guatemala) states that the gathering of sarsaparilla and the bleeding of rubber trees decreased in proportion with the increase of the banana industry. The cause is not difficult to see ; the "Nulero" and the "Sarsero" gave up their former toilsome occupation and turned their attention to the more profitable banana planting. The total amount of sarsaparilla shipped from Livingston during the last four months of 1903 amounted to 61 bales weighing 11,032 ℔.'

At the drug sale on the 18th. it was reported that there was an absence of good quality sarsaparilla of any description ; rather course Lima Jamaica fetched 10*d.* Twelve bales of fair grey Jamaica sold at from 1*s.* to 1*s.* 1*d.*, and a bale of medium native red was disposed of at 9*d.*

TAMARINDS, KOLA NUTS, CASSIA FISTULA, ETC.

Of other products it may be noted that at the first spice sale, 60 barrels of Barbados tamarinds were offered and bought in at 8*s.* 6*d.* per cwt.

Two bags of fair bold West Indian kola nuts were offered on the 18th. for which $5\frac{1}{2}d.$ was asked, while at the same sale, 12 barrels of ordinary mouldy and partly shrivelled African were disposed of, at from $2\frac{3}{4}d.$ to 3*d.* per ℔. On the 24th., 11 packages of West Indian, including green, were sold at from 6*d.* to 10*d.*, dry at from 3*d.* to $3\frac{1}{2}d.$ and common at 2*d.* per ℔.

On the 18th., 28 packages of *Cassia Fistula* were offered and 5 sold. Good bold, part rattly Dominica fetched 25*s.*, and 4 bags of part mouldy were sold at 10*s.* per cwt.

Twelve bags of fair Madras but more or less sea-damaged annato seed, were sold at $1\frac{3}{4}d.$ to $3\frac{1}{4}d.$ No West Indian has been offered.

The quotations for good raw West Indian lime juice have been 1*s.* 2*d.* per gallon and refined 1*s.* 3*d.*

White Wax. Mr. S. T. Dunn, Superintendent of the Botanical Department, Hongkong, in a report on the agricultural possibilities of Weihaiwei, states that *Fraxinus chinensis*, the tree upon which insect wax is produced, is common around Weihaiwei, and the valuable white wax is sparingly cultivated upon it by the Chinese. Although the insect deposits its wax upon the ash it breeds upon a species of privet (*Ligustrum lucidum*), and either the insect must be imported from a district where this tree grows or else the tree must be introduced, for it has not been observed in Shantung. The price of white wax has fallen and the supply has diminished of late years, but if a regular outturn were secured and exported, the industry might be carried on profitably by the farmers in their spare time. (*Consular Report* on Weihaiwei, 1903.)

MARKET REPORTS.

London,—September 13, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR, September 9; and 'THE PUBLIC LEDGER,' September 10, 1904.

ALOES—Barbados, 13/- to 35/- ; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* per lb.
BALATA—Block, 1/3 per lb.
BEES'-WAX—£7 10*s.* to £7 12*s.* 6*d.* per cwt.
CACAO—Trinidad, 58/- to 62/- per cwt. ; Grenada, 54/- to 58/- per cwt. ; Dominica, 51/- to 56/- per cwt. ; Jamaica, 53/6 to 57/- per cwt.
CARDAMOMS—Mysore, 7½*d.* to 2/- per lb.
COFFEE—Jamaica, good ordinary, 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 13*d.* ; fine, 14*d.* ; extra fine, 16*d.* per lb.
FRUIT—
BANANAS—Jamaica, 2/- to 4/- per bunch.
GRAPE FRUIT—Jamaica, 10/- per case.
ORANGES—Jamaica, 8/- to 9/- per case.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Fair to good bright, 42/6 to 47/6 ; common to middling, 29/- to 37/6 per cwt.
HONEY—16/- to 19/6 per cwt.
ISINGLASS—West Indian lump, 2/5 to 2/10 ; cake, 1/1 to 1/3 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 1/4 per gallon; concentrated, £14 per cask of 108 gallons.
LIME OIL—Distilled, 1/6 per lb. ; hand-pressed, 2/6 to 2/9 per lb.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—Fair to good pale, 1/6 to 1/11; red 1/3 to 1/5 ; broken, 1/- to 1/1 per lb.
NITRATE OF SODA—Agricultural, £10 5*s.* per ton.
NUTMEGS—54's, 2/3; 102's, 9*d.* ; 158's, 5¾*d.* ; shell, 4½*d.* to 5*d.* per lb.
PIMENTO—2⅝*d.* per lb.
RUM—Demerara, 7*d.* per proof gallon; Jamaica, 1*s.* 9*d.* to 1*s.* 9½*d.* per proof gallon.
SARSAPARILLA—Jamaica, 8½*d.* to 9½*d.* per lb.
SUGAR—Crystallized, 17/6 to 18/6 per cwt. ; Muscovado, Barbados, 13/6 to 14/- per cwt. ; Molasses, 11/6 to 15/6 per cwt.
SULPHATE OF AMMONIA—£12 per ton.

Montreal,—September 9, 1904.—Mr. J. RUSSELL MURRAY. (In bond quotations.)

BANANAS—Jamaica, 75c. to 95c. per bunch of 8 hands ; $1·05 to $1·15 per bunch firsts ; $1·40 to $1·50 per bunch Jumbos, c. & f.
CEDAR—Trinidad, 40c. per cubic foot, c. & f.
COCOA-NUTS—Jamaica, $25·00 to $27·00 ; Trinidad, $21·00 to $23·00 per M., c. & f.
COFFEE—Jamaica, medium, 9c. to 10c. per lb., c. & f.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per lb., c. & f.
LIMES—Jamaica—No quotations.
MOLASCUIT—Demerara, $1·32 per 100 lb., c. & f.
MOLASSES—Barbados, 24c. to 26c. ; Antigua, 20c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. to 19½c. per lb., c. & f.
PIMENTO—Jamaica, 6¼c. to 7c. per lb., c. & f.
PINE-APPLES—Cubans, crates 36's to 10's, $3·00 to $4·10.
SUGAR—Grey Crystals, 96°, $2·60 to $2·70 per 100 lb., c. & f.
—Muscovados, 89°, $2·30 to $2·60 per 100 lb., c. & f.
—Molasses, 89°, $2·15 to $2·30 per 100 lb., c. & f.
—Barbados, 89°, $2·40 to $2·45 per 100 lb., c. &. f.

New York,—September 16, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12¼c. to 13c. ; Jamaica—No quotations ; Grenada, 12c. to 12¼c. ; Trinidad, 12c. to 13c. per lb.
COCOA-NUTS—Trinidads, $28 to $30 per M., selected ; Jamaicas—$32·00 per M.
COFFEE—Jamaica, good ordinary, 8¾c. per lb.
GINGER—Jamaica, good grinding, 7½c. to 8c. ; bold root, 8¼c. to 8½c. per lb.
GOAT SKINS—Jamaicas, 54½c. per lb.
PIMENTO—5c. per lb., spot quotation.
SUGAR—Centrifugals, 96°, 4¼c. to 4 5/16c. ; Muscovados, 89°, 3¾c. ; Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—September 24, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·50 to $3·60 per 100 lb.
CACAO—Dominica, $13·50 per 100 lb.
COCOA-NUTS—$13·50 per M. for husked nuts.
COFFEE—Jamaica, $10·00 to $11·00 ; ordinary Rio, $12·00 per 100 lb.
HAY—95c. to $1·00 per 100 lb.
MANURES—Nitrate of soda, $60·00 ; Ohlendorff's dissolved guano, $60·00 ; Sulphate of ammonia, $72·00 to $75·00 ; Sulphate of potash, $67·00.
MOLASSES—Market closed.
ONIONS—Madeira (stringed), $1·75 to $2·00 per 100 lb.
POTATOS, ENGLISH—$2·88 ; Nova Scotia, $2·16 to $3·09 per 160 lb.
RICE—Ballam, $4·60 to $4·72 per bag (190 lb.) ; Patna, $3·40 per 100 lb.
SUGAR—Market closed.

British Guiana,—September 22, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $7·50 per barrel.
BALATA—Venezuela block, 25c. ; Demerara sheet, 35c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—$6·00 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 13½c. to 14c. per lb. (retail). —Creole, 11c. per lb.
DHAL—$4·25 to $4·30 per bag of 168 lb.
EDDOES—84c. per barrel.
MOLASSES—Vacuum Pan yellow, 15½c. per gallon (casks included).
ONIONS—Madeira, $1·90 to $2·00 per 100 lb. ; Teneriffe, $1·50 to $1·75 per 100 lb.
PEA NUTS—American, 7c. per lb. (retail).
PLANTAINS—16c. to 36c. per bunch.
POTATOS, ENGLISH—Lisbon and Madeira, $1·50 per 100 lb. (retail).
RICE—Ballam, $4·40 to $4·45 ; Creole, $4·50 per 177 lb., ex store.
SWEET POTATOS—Barbados, 72c. to 84c. per bag.
TANNIAS—$1·80 per barrel.
YAMS—White, $2·64 per bag.
SUGAR—Dark Crystals, $2·50 to $2·60 ; Yellow, $2·90 to $3·00 ; White, $3·50 to $3·75 ; Molasses, $2·00 to $2·25 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75 and $5·50 per M.

Trinidad,—September 21, 1904.—Messrs. GORDON, GRANT & Co. ; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, $12·35 ; Estates, $12·40 to $12·60 ; Venezuelan, $12·45 to $12·65 per fanega (110 lb.).
COCOA-NUTS—$19·00 per M., f.o.b.
COCOA-NUT OIL—77c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 7¾c. per lb.
COPRA—$2·80 per 100 lb.
ONIONS—$1·20 to $1·25 per 100 lb.
POTATOS, ENGLISH—$1·40 to $1·65 per 100 lb.
RICE—Yellow, $4·10 to $4·40 ; White Table, $5·25 to $5·50 per bag.

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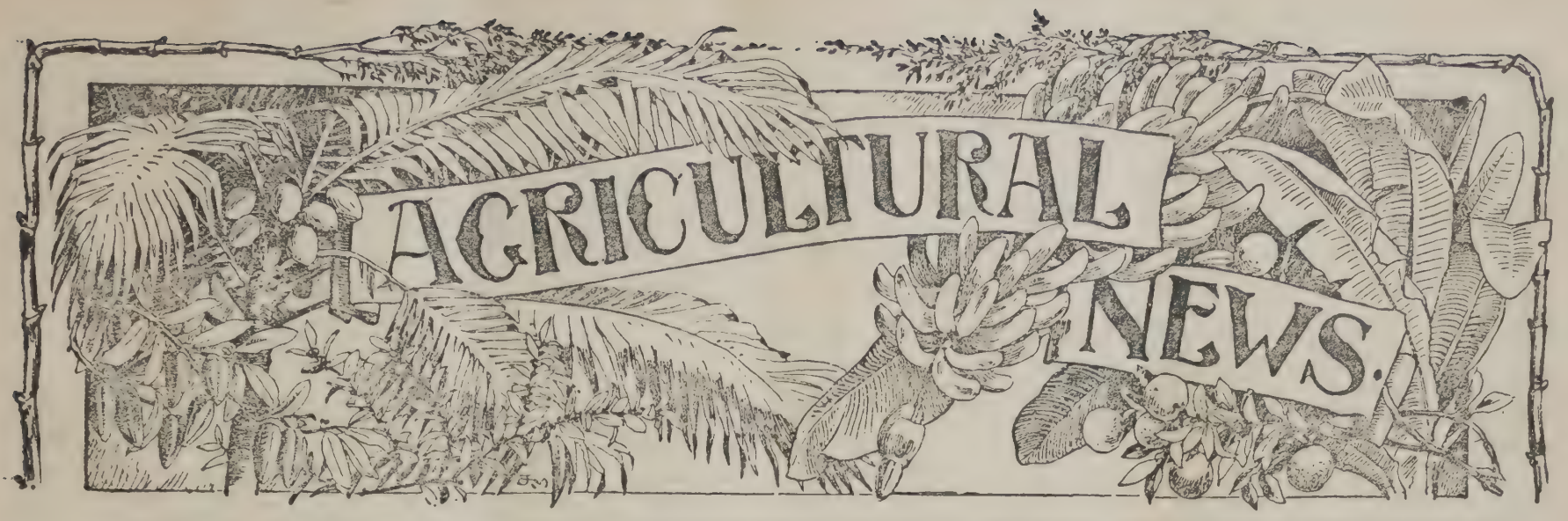
'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the Cotton-growing districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.



A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 66. BARBADOS, OCTOBER 22, 1904. PRICE 1*d*.

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Bee-keeping Industry in Jamaica.

OF all the British West India Islands Jamaica is the only one in which the bee-keeping industry has attained a really important position. It is probably not generally realized that the annual exports of honey from Jamaica are worth about £10,000, and those of wax over £6,000. Of recent years much progress has been made in this industry, and Jamaica has won a good name in the markets for both honey and wax.

The following figures, giving the amount and value of the exports of honey during the past six years, are of particular interest in indicating the material progress that has been made:—1897, 2,440 cwt. (£1,891); 1898, 4,934 cwt. (£2,124); 1899, 5,037 cwt. (£3,673); 1900, 8,174 cwt. (£6,539); 1901, 13,423 cwt. (£10,738); 1902, 16,804 cwt. (£9,241). These figures are obtained from the annual report of the Collector General for the year 1901, who states: 'The improvement in the exports of honey bears witness to the combined intelligence and patience which are being brought to bear on the production of minor products. Bee keepers have adopted centrifugal apparatus for expelling the honey from the comb, and the comb itself, instead of being melted down as heretofore, is returned uninjured to the hive, thus considerably increasing the output of the more valuable product, honey, whilst reducing that of wax.'

In that way, then, can we account for the decline of recent years in the export of wax from the island. In 1898, 1,590 cwt. were exported, of the value of £10,388: in 1902, the amount was 992 cwt., and the value £6,020.

There is no doubt that the progress of the Jamaica bee-keeping industry is mainly due to the efforts of the Jamaica Bee Keepers' Association. This

is a commercial undertaking, working along co-operative lines, which has set itself steadily to improve the quality and the appearance of the honey shipped. With this object in view a board of examiners was appointed, which inspects every package sent by members to the Association for shipment. The product is graded by the examiners, and if it is found to come up to the required standard, the package is branded with the Association's stamp. In the market reports Jamaica honey has, during the last few months, been quoted at from 15*s.* to 30*s.* per cwt.

In regard to Jamaica bees'-wax, it has already been mentioned that the exports have of late declined somewhat. It is interesting to note, however, that, according to a writer in the *Journal of the Jamaica Agricultural Society* (Vol. VII, p. 186), Jamaica wax always finds a ready sale in the market on account of its undoubted purity. It fetches from £7 10*s.* to £8 15*s.* per cwt., as against £6 10*s.* to £7 7*s.* 6*d.* for French, Italian and Spanish wax, and £6 10*s.* to £6 15*s.* for wax from Madagascar. It is principally used in the manufacture of boot and furniture polishes, for tailors' wax, photographic compositions, etc. Of late years there has been an increase in the exports to the United States and a decrease in the shipments to the United Kingdom. This product is now quoted in the London market reports at £7 10*s.* to £7 12*s.* 6*d.* per cwt.

The Imperial Department of Agriculture has given considerable encouragement to the bee-keeping industry in the West Indies, and there are indications that the business is being taken up with a certain amount of enthusiasm in some of the islands. In St. Lucia, especially, distinct progress has been made in recent years, and there are now a fairly large number of colonies kept in modern hives. So far, the exports from St. Lucia and the other islands in which bee keeping has been taken up have been in very small quantities, but there is every indication that in the course of a few years, when there will be less necessity for thinning colonies for purposes of increase, a large honey yield will be obtained. Of course, it must be understood that much of the success that has attended the establishment of this industry in Jamaica is due to an abundance of honey flowers, especially logwood. In Barbados, for example, there is not much prospect of bee keeping being carried on successfully on a large scale on account of the scarcity of honey-yielding flowers.

We have given the above short sketch of the progress in this industry in Jamaica that bee keepers in the West Indies may realize the possibilities of this profitable undertaking. At the same time we desire, by mentioning the efforts of the Jamaica Bee Keepers' Association, to give prominence to the necessity of taking steps to secure that only a good grade of honey and wax shall be shipped.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

At a meeting of the Barbados Agricultural Society held on October 14, a paper was read by Professor J. P. d'Albuquerque and Mr. J. R. Bovell on the results of the sugar-cane experiments carried on at Barbados under the direction of the Imperial Department of Agriculture. The following is a short summary of the results with seedling canes:—

In the first place, we invite your attention to the comparative results of a few of the best seedling varieties for the past five years, together with those obtained with the White Transparent variety.

As you are aware, these canes have been grown on duplicate plots in several estates situated in representative parts of the island. The plots usually contain 100 stools of canes each; they are cultivated under the ordinary conditions of the estate where they are grown, and care is taken to eliminate any error that might be due to the growth of one variety interfering with that of a neighbouring one. Now, while the plots are small, there are several of each kind and an average is taken of each variety, and there is distinct evidence, wherever these results can be brought into comparison with those of the canes grown on the ordinary estate scale, to show that the results of the plots agree very well with the results on the estates.

In black soils, an average of five years' experiments shows that plots of White Transparent plant canes yielded about $2\frac{1}{3}$ tons of sugar per acre. This, we think, agrees fairly well with estate results when it is remembered that the land of all the fields upon which these canes were grown was good land. The plots of White Transparent ratoon canes in black soils yielded about 1 ton of sugar per acre.

In red soils White Transparent plant canes gave a little less than 2 tons of sugar per acre, and the ratoons gave about $1\frac{1}{2}$ tons of sugar per acre. These results again agree, we think, very well with those on a large scale on similarly situated estates.

The black soil districts are not generally regarded as favourable to ratooning. In black soils, therefore, the results of plant canes are looked upon as all-important. Looking at the results for the five years, only two seedling varieties, viz., B. 208, and B. 147, have exceeded in their yields those of the White Transparent variety.

On the average of five years' experiments, the differences in favour of B. 208 and B. 147, as compared with the standard variety, are small, amounting to 5 per cent. in the case of B. 208, and 4 per cent. in the case of B. 147.

Five per cent. increase on a long average is not to be despised, but at the same time it is not such as to satisfy the aspirations either of the planters or those engaged in sugar-cane experiments. Certainly much more than that is hoped for from the raising of seedling canes, when the large numbers that have been annually raised for the past five years come to be thoroughly tested.

The juice of B. 208, both with the plot-samples and samples grown on trial areas of an acre and upwards, and sent from the estate mills, is uniformly very rich and very pure: and on this account the cane merits some attention from muscovado plantations.

B. 147, on the other hand, yields a juice which, on the average, is less pure than that of the White Transparent, and in many cases, especially in unfavourable years, would give trouble in the muscovado factory.

These results have been calculated as an average of plots in St. Michael, Christ Church, St. Philip, and St. Lucy, but it should be pointed out that B. 147 has given uniformly high comparative results, year after year, at Dodds, St. Philip, and in St. Lucy, and that there is no doubt in our minds that in certain thin and well-drained black soils B. 147 does give a yield which is a substantial increase on the White Transparent. We can testify that the results of the estates of a large company that grow this cane upon a large scale, show that this variety in St. Philip parish can be made to give both as plants and ratoons higher results than the White Transparent, and evidence is forthcoming from other cane-growing countries of the excellence of this variety. Still, it is evident that, for general cultivation in other parts of Barbados, this variety cannot be recommended.

In black soils, the ratoon yields of sugar were as follows:—White Transparent, 2,400 lb.; B. 208, 2,900 lb.; B. 147, 2,800 lb.

The results in red soils are more encouraging to the experimenters than those in the black soils.

The yields of muscovado sugar of the White Transparent variety were:—plant canes, 4,300; ratoons, 3,500 lb.; average, 3,900 lb.

B. 208—plants, 5,650 lb.; ratoons, 3,800 lb.; average, 4,700 lb. Increase over White Transparent, 20 per cent.

D. 95—plants, 4,550 lb.; ratoons, 4,480 lb.; average, 4,520 lb. Increase over White Transparent, 16 per cent.

B. 147—plants 4,070 lb.; ratoons, 2,290 lb.; average, 3,180 lb.

These red soil results, we think, should lead planters to give to B. 208 a careful and universal trial on a small estate scale. B. 208 owes its yield partly to the extreme richness and purity of its juice, and it often happens that, although the yield of canes, and therefore their field appearance, is not equal to that of White Transparent, the results when it comes to the factory eclipse those of White Transparent. We urge a general trial of B. 208 on a small scale in red soils.

Evidently the ratoon results on red soils of B. 147 put it entirely out of the question as a variety for those districts.

Turning now to the year 1904, taken alone, the results are chiefly of interest as introducing, for the first time as selected seedlings, a few of the newer seedling varieties.

It is appropriate at this point briefly to view the weather conditions of the season under report. As we all clearly remember, the rainfall for the first nine months was all that a planter could desire, and led to a good spring of young canes and a luxuriant growth. Late in October and in November, however, which is generally recognized as a critical period in regard to the yield of the cane, a period of some weeks of severe drought set in, a drought that completely checked the growth of the crop. This was followed by heavy rains that lasted till quite late into the following reaping season. On the whole, the weather conditions were highly favourable to a large return, but at the same time the November drought must have had the effect of sensibly diminishing the crop.

The crop of 1904 is not what was expected from these conditions. But, in the first place, the conditions were not equal everywhere. To leeward, for example, the rainfall could not be painted in the favourable colours used for the rest of the island. Then again the crop is recorded in estimated hogsheads, and the estimated hogshead this year was above the average weight. Were the crop reckoned in tons, the comparative yield of the year would show up more favourably.

But over and above these reasons, it should be borne in mind that owing to several estates being in recent years sold out in small lots, there is less land under cane cultivation. Then, land that used to be in plant canes is now in ratoons; upwards of 1,000 acres were under cotton, some was under bananas, and lastly, the estates have adopted a policy of self-support which involves a rotation of crops and a proportion of land under provision and fodder crops.

Briefly put, the following are some of the most interesting results in the black soils.

Yield of muscovado sugar per acre:—

White Transparent—plants, 5,560 lb.; ratoons, 2,960 lb.; average, 4,300 lb.

B. 208—plants, 5,660 lb.; ratoons, 3,800 lb.; average, 4,740 lb.

B. 147—plants, 5,320 lb.; ratoons, 3,130 lb.; average, 4,230 lb.

B. 1,529—plants, 7,470 lb., i.e., 30 per cent. increase on White Transparent plant canes of the same year.

This variety gave favourable yields on single plots in the two previous seasons, a result that led to its trial as a selected seedling. The favourable results of this cane are due to a combination of good tonnage and very rich and pure juice. The cultivation of this variety will be extended at once to as many experimental plots as possible. It is premature to say whether the results of this year will be confirmed in our subsequent trials.

The remaining seedlings grown in black soils call for no special comment. The results in muscovado yields are given as follows:—

D. 842—plants, 5,480 lb. D. 95—plants, 5,410 lb.; ratoons, 4,960 lb.; average, 5,190 lb. D. 1,438—plants, 5,400 lb. B. 376—plants, 5,300 lb.; ratoons, 3,032 lb.; average, 4,160 lb.

The more interesting red soil results were as follows—yields calculated on muscovado sugar:—

White Transparent—plants, 5,400 lb.; ratoons, 4,830 lb.; average, 5,120 lb.; B. 208—plants, 7,210 lb.; ratoons, 4,260 lb.; average, 5,740 lb.

B. 1,529—plants, 6,650 lb.

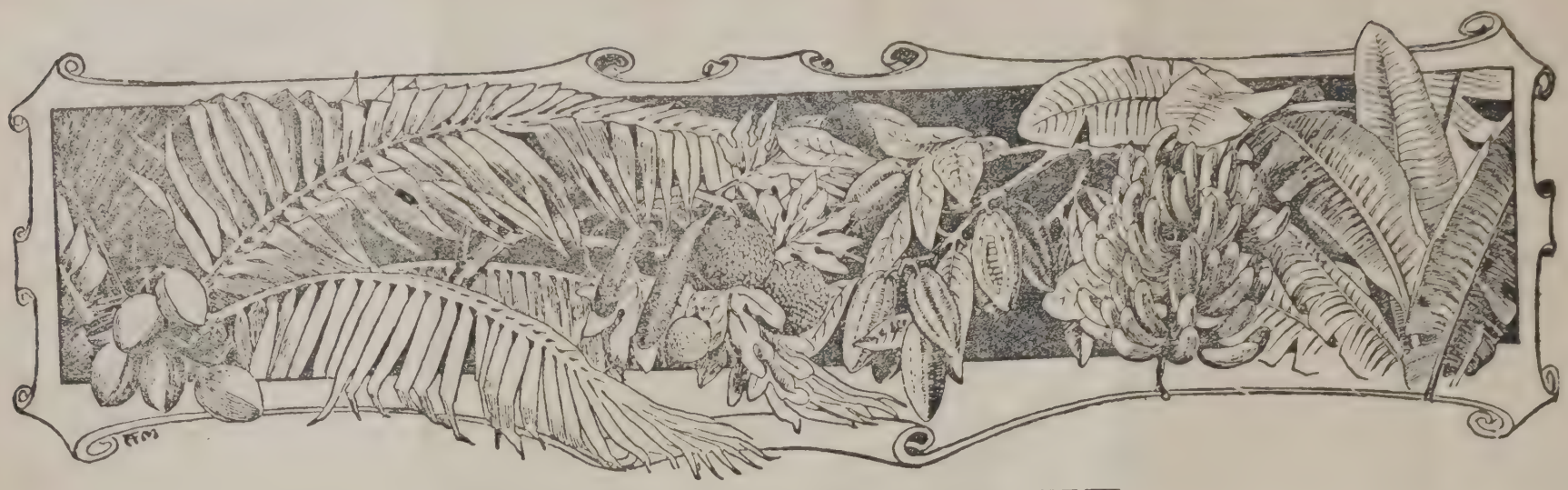
B. 376—plants, 6,360 lb.; ratoons, 5,290 lb.; average, 5,830 lb.

B. 393—plants, 5,980 lb.; ratoons, 1,950 lb.; average, 3,960 lb.

B. 379—plants, 5,480 lb.; ratoons, 5,272 lb.; average, 5,370 lb.

D. 95—plants, 5,210 lb.; ratoons, 5,390 lb.; average, 5,300 lb.

Three varieties, viz., B. 208, B. 1,529, and B. 376 have given yields which show an increase over the White Transparent.



WEST INDIAN FRUIT.

PINE-APPLES IN HAWAII.

The following is a brief summary of interesting observations made in the annual report on the Agricultural Experiment Station in Hawaii on the cultivation of pine-apples:—

There are two large pine-apple canneries in successful operation in the island of Oahu. Experiments in the cultivation of this crop have been carried on for fully twenty years. Practically all the known varieties have been imported from different parts of the world. It has been found that the Smooth Cayenne is the best adapted to Hawaiian conditions.

The Hawaiian canned pine-apples are superior in quality to any others now placed on the American market, because they are allowed to ripen and attain their fullest development in the field. The pines have not been affected by any serious disease; they are also comparatively free from insect injury. There are many thousand acres of land suited to the cultivation of pine-apples, and the industry is capable of very great expansion. As long as the Hawaiian growers maintain the high standard of excellence now existing, there will be an almost unlimited market.

CULTIVATION OF ORANGES IN DOMINICA.

The Hon. Francis Watts writes that while in Dominica recently he visited 'Corona,' the orange plantation belonging to Mr. Scully, in connexion with which there is an experiment plot, under the direction of the Imperial Department of Agriculture, for the cultivation of varieties of oranges. Dr. Watts makes the following remarks on this cultivation :—

Mr. Scully's oranges look remarkably well, some of them being about to come into bearing. Scale insects have been controlled by the careful use of insecticides. Mr. Scully remarked that the young plants received from the Dominica Botanic Station are in much better condition than those coming from Jamaica.

The system of cultivation adopted has much to commend it. It agrees well with the general principles I have tried to lay down. A circle, 10 feet in diameter, is kept clean round each tree: no weeds are allowed to become established in this space, which is weeded at frequent intervals, care being taken not to scrape the soil away from the roots of the tree. The intervening space between the clean circles is not forked or dug up, the grass and weeds being cut down at intervals and used as a surface mulch. The condition of the soil appears to be all that can be desired.

FRUIT IMPORTS OF THE UNITED STATES.

The following note on the importation of fruit, especially bananas and lemons, into the United States appeared in the *Crop Reporter* (published at Washington by the authority of the Secretary of Agriculture) for September:—

The fruits imported into the United States in large quantities are almost exclusively from tropical America, and from Southern Europe, and from Turkey-in-Asia. As estimated by value, over one-third of the imports consists of bananas; these are derived chiefly from Central America, Cuba, and the British West Indies; they are imported in quantities ranging from 25,000,000 to 30,000,000 bunches annually, and their cost, laid down at ports of the producing countries, ranges from $7,000,000 to $8,500,000 a year. To these may be added annually about $25,000 worth of plantains, a fruit closely resembling the banana and used for cooking purposes in some of the Southern States.

Next in importance to bananas in the import fruit trade are lemons, for which upwards of $3,000,000 are expended abroad annually, Italy (Sicily) being the almost exclusive source of supply. These two products, bananas and lemons, regularly constitute in value over one-half the total annual imports of fruit.

Pine-apples are imported from tropical America in considerable quantities: the annual imports amount in value to $500,000 to $600,000.

SPICES IN ZANZIBAR.

The *Consular Report* on the trade of Zanzibar and Pemba contains interesting references to the spice industry:—

The clove crop for 1903 was an exceptionally good one for the island of Zanzibar, and an exceptionally bad one for the island of Pemba. The exports were of the value of £186,399 and £88,592, respectively. Cloves represent about 80 per cent. of the value of the total exports from Pemba year by year, copra and cocoa-nuts standing for 16 per cent.

The exports of chillies from Zanzibar amounted to 516,428 lb., valued at £7,116. It is to be regretted that more attention is not paid to the cultivation of this crop, for which the soil of these islands is especially suitable.

Thanks to local legislation, copra and chillies are being brought into market in a much better condition than heretofore. Cloves also are cleaner and drier, and more free from khoker and stems.

COTTON INDUSTRY.

Virgin Islands.

Mr. W. C. Fishlock, Agricultural Instructor at Tortola, reports:—

I have very little reliable information with reference to the amount of cotton planted in the Virgin Islands. The weather during May, June, and July was very dry, and it was impossible to plant, although much land was cleared.

I believe about 15 to 20 acres have been planted at Norman Island, and I am informed that a considerable amount has been planted at Virgin Gorda. I should say that there is every prospect of 50 acres being planted in cotton in this presidency.

In most cases people have saved and planted their own seed. Some was obtained from St. Thomas, and 100 lb. from the station.

Tobago.

Mr. H. Millen, Curator of the Botanic Station at Tobago, reports as follows on the prospects of cotton growing in the island:—

The approximate area planted is 120 acres, of which 80 acres are planted in Marie Galante cotton, and the remaining 40 acres in Sea Island.

It is probable that not more than 50 acres will be planted this season. One reason why planting was not more extensively carried on was on account of the want of machinery for cleaning the cotton.

A cotton gin and a baling press have been received from the British Cotton-growing Association. This is the second lot of machinery imported into the island for this purpose. Now that machinery has been received, planters will be stimulated to plant, as they can now be certain of getting their cotton cleaned for export.

From this station 53 lb. of Sea Island cotton seed have been distributed; several planters have also obtained seed direct from Trinidad.

Montserrat.

Mr. A. J. Jordan, Curator of the Botanic Station, has reported as follows on the prospects of the cotton industry in Montserrat:—

During this season 2,730 lb. of Sea Island seed have been distributed through the Department, and about 600 lb. of planters' own seed have been treated with corrosive sublimate solution at Grove Station.

About 600 acres have been planted, and if proper care is exercised to keep the leaf-blister mite in check, and neither the 'black boll' nor any new disease attacks the plants, an average yield of 200 lb. of lint is expected to be reaped.

Since the middle of July the weather has been excellent for the growth of cotton, and seed sown at that time has developed into plants about 4 feet in height, which are already setting pods.

No attacks of the cotton worm have been reported, but a large, black caterpillar was seen eating the stems of the seedlings. The damage done by these was not, however, considerable.

A greater space has been allowed to each plant than last year, most planters having planted at 4 feet by 2 feet, some at even 5 feet by 3 feet.

St. Kitt's.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following report on the prospects of the cotton industry in that island:—

From information collected, I find that the area of cotton already planted is 1,000 acres, and arrangements are being made to plant 50 more during the month. This will make a total area of 1,050 acres.

Of this area 500 acres have been planted with the selected Sea Island seed imported by the Imperial Department of Agriculture, and 550 acres with seed from Sea Island cotton grown locally.

The cotton crop in the island is, on the whole, in a very promising condition; the earlier-planted cotton is already bearing heavily.

The cotton worm has made its appearance in a few localities, but has been at once kept in check by the application of Paris green. The leaf-blister mite has also attacked the plants in some places, and a mixture of sulphur and lime has been used. Since the recent rains these pests have not been so troublesome, and consequently there seems to be a good prospect for the cotton.

The amount of imported Sea Island seed, sold and planted in St. Kitt's, was 2,295 lb.

Gambia.

Considerable space is devoted in the *Annual Report* on Gambia for 1903 to an account of the efforts that have been made in that colony to establish a cotton-growing industry. The following brief summary is likely to be of interest:—

In the early part of 1902, 1,325 lb. of American, and 1,185 lb. of Egyptian, seed were distributed among the Chiefs of the protectorate. The result cannot be said to have been very satisfactory, as only 578 lb. of lint were shipped to England. The failure of the crop was attributed by the natives to the seed having been sown too early: it is considered, however, that it is more probable that it was due to intentional want of care on the part of the farmers, who hoped that, in the event of the first crop proving a failure, the experiment would be abandoned and they would be allowed to continue their ground nut planting in peace.

The first shipment of 112 lb. of lint realized 6*d.* per lb.; probably the price would have been higher, had the quantity been greater. The brokers reported that this cotton was superior to the usual, rough West African cottons, and were of opinion that, with careful cultivation and proper picking and ginning, West African cotton might obtain equal prices with American Upland.

As a result of the visit of an expert sent out under the auspices of the British Cotton-growing Association early in 1903, special attention has been devoted to experiments in the Upper River district where an experimental farm has been established. It is estimated that in that district about 400 acres have been planted in cotton.

The crop for 1903, which was expected to be about 50 to 60 tons of seed-cotton, was being bought by the Government at 2*d.* per lb.—a price which is readily accepted by the natives but which has been fixed for the purpose of encouraging the natives and cannot be regarded as likely to make the experiment a profit-making one.

The yield may be said to be about 300 lb. of seed-cotton per acre. With this yield the crop is not likely to be as profitable as ground nuts. On the other hand, there is no reason why the yield should not be raised to 450 lb.

NOTES FROM EAST AFRICA.

Mr. Henry Powell, formerly Curator of the Botanic Station at St. Vincent, now Assistant in the Agricultural Department of British East Africa, has forwarded the following notes which are of interest to agriculturists in the West Indies:—

Ravenala madagascariensis.—The fruiting 'Travellers' palm' at the Botanic Station, St. Vincent, was raised in 1890 from seed received from the Royal Gardens, Kew. Only one other 'Travellers' palm,' established at the station, was raised from seed—the others being either imported from Trinidad, or grown from suckers.

Passiflora edulis.—This is very common at Nairobi and in other parts of East Africa. It yields an abundant crop of delicious fruit, and seed can readily be obtained here, for the West Indies, if desired.

When in London recently the writer took notes at the Natural History Museum on mungoose, agouti, and manacou, these animals having been familiar to him at St. Vincent.

Mungoose.—The mungoose so common in St. Vincent appeared to be closely allied to one labelled East Africa or dusty mungoose (*Herpestes pulverulentus*).

Other similar mungoose were Ceylon mungoose (*Herpestes fulvescens*) and Indian mungoose (*Herpestes mungo*).

The white-tailed Natal mungoose (*Herpestes albicauda*) is 3 feet in length and a foot high.

A label on the case stated that 'all are deadly foes to snakes but succumb if bitten, their agility saving them.'

In the Nairobi district there are several species of mungoose including one with a white tail. The 'Puff Adder' (*Bitis Gabonica*) and other deadly snakes are fairly common around Nairobi, but as these usually make their homes in holes in the ground, the mungoose has a more difficult task to kill them than in the West Indies.

Agouti.—The agouti (*Dasyprocta agoutis*, or *agutis*).—These are labelled 'Rodents' and there are said to be ten known species, all nocturnal.

Manacou.—This is classed with the opossums. A specimen labelled *Didelphys Marsupialis* from Florida, closely resembled the St. Vincent manacou, but the first-named was somewhat larger and greyer in colour.

Palm Nut Cracking Machine.—At the Imperial Institute the writer saw one of these machines tested, and was convinced that by means of this machine the nuts of the Gri-Gri palm of St. Vincent could be turned to account. The makers are Adam Knox & Sons, Engineers, Glasgow.

It is known that the fibre obtained from the leaflets of this palm is among the finest and strongest in the world, but is difficult to extract.

Cotton Industry.—The writer is very pleased at the success of the cotton industry in St. Vincent and trusts that planters and others there are very largely increasing the area under cotton this year. East Africa with its thousands of acres of cotton land will be in the field in a year or two, and it should be the aim of the St. Vincent community to grow only the best possible kind, as recommended by the Imperial Department of Agriculture.

JOB'S TEARS AS A POULTRY FOOD.

On p. 275 of this volume of the *Agricultural News* we published some information from the *Agricultural Ledger* in regard to the use of 'Job's tears' as a famine food. It appears that these seeds are used in Jamaica for feeding poultry, and the following note by Mr. H. H. Cousins, M.A., F.C.S., appears in the *Bulletin of the Department of Agriculture*, Jamaica, for September:—

The seeds of *Coix Lacryma-Jobi*, popularly known as Job's tears, are used as food for poultry, and two samples have been submitted to the laboratory for analysis.

The outer husk is very hard and the seeds must be crushed before being fed to the fowls. The digestible portion is mainly starch, and this food cannot be recommended for laying fowls. It should, however, prove a useful material for feeding to poultry in process of fattening for the table.

The analytical data as determined by Mr. H. S. Hammond, F.C.S., are as follows:—

Constituents.	(1)	(2)
Moisture	9·87	7·33
Fats	0·62	0·52
Nitrogenous matter* ...	7·44	6·56
Indigestible fibre	21·96	19·21
Carbohydrates	43·52	51·02
Ash	16·59	15·36
Total	100·00	100·00
* Nitrogen	1·19	1·05

It would appear that the above figures are for unhusked seeds, and this fact must be borne in mind in comparing these results with those previously published for Indian seeds, where the analyses of kernels are given.

SISAL HEMP INDUSTRY IN THE CAICOS ISLANDS.

In the *West Indian Bulletin* (Vol. V, no. 2) an account was given of the progress of the sisal hemp industry in the Bahamas and the Caicos Islands. On p. 151 a table was published giving the value of the exports from the Caicos Islands since 1894. At the time of preparing that article we were not in possession of the necessary information as to the amount of the exports to make the table complete. We have since received from the Commissioner of the Turks and Caicos Islands figures which enable the table to be completed as follows:—

Year.	Export in pounds.	Declared value.	Year.	Export in pounds.	Declared value.
1894	69,501	£ 419	1899	510,406	£7,493
1895	95,788	620	1900	349,482	5,080
1896	167,592	1,047	1901	461,183	6,551
1897	405,898	2,539	1902	498,334	7,100
1898	469,825	2,901	...	...	...

POULTRY NOTES.

The following notes are taken from the *Farm Journal* of Philadelphia :—

In killing lice on chicks, quick work can be done by taking a machine-oil can filled with lubricating oil and putting a drop or two on each chick's head.

For diarrhoea, or cholera, in hens, ducks, or turkeys, give a weak solution of copperas, say a piece as large as a pea to a tea-cupful of water. If they have real cholera they will readily drink this, if given to them for drinking water.

Canker in fowls can be successfully treated by washing the head and eyes, and rinsing out the mouth and throat, with a dilute solution of chlorate of potash and alum, equal parts. Remove the ulcers with a quill and apply powdered burnt alum to the places left bare. Repeat twice a day. Isolate the sick fowl.

Pip is not a disease : it is a condition. A hard substance develops on the tongue, which interferes with the partaking of food, especially hard grains. Anoint the tongue with glycerine, repeating the treatment several times in succession, and a cure is generally effected.

Breeding Turkeys.

In *Farmers' Bulletin* No. 200, of the United States Department of Agriculture, 'Turkeys: Standard varieties and Management,' the following observations are made on the selection and treatment of breeding stock :—

There are some rules that must be followed in the selection of turkeys for breeding, if it is hoped to succeed. Careless neglect has given no end of trouble to turkey raisers. In some instances, which the writer has investigated, all the turkeys owned in one locality have descended from the one original pair purchased many years before. If this foolish procedure had been continued, it would have resulted in the destruction of the constitutional vigour of the turkeys.

A few plain rules which may be observed to advantage are as follows:—

Always use as breeders turkey hens over one year old. Be sure they are strong, healthy, and vigorous, and of good, medium size. In no instance select the smaller ones. Do not strive to have them unnaturally large.

The male may be a yearling or older. Do not imagine that the large, overgrown males are the best. Strength, health, and vigour, with well-proportioned size, are the main points of excellence.

Avoid close breeding. New blood is of vital importance to turkeys. Better send a thousand miles for a new male than to risk the chances of inbreeding.

AFRICAN RUBBER.

The *East African Quarterly* (Vol. I, no. 2) reproduces from the *Anglo-African Argus* the following interesting note on African rubber :—

The question of making West African rubber more marketable is now exercising the minds of merchants engaged in that trade. The rubber that comes from Para (South America) fetches on the English market double the price of that product from West Africa. The only reason for this is the different method of curing the rubber when taken from the tree—a very simple process. The way to effect it is as follows, writes a correspondent : 'After the milk has been collected and brought to the house, a smoke fire is made, over which a funnel is placed, then a stick is cut, made to the shape of a paddle, which is dipped in the milk and then held over the top of the funnel in the smoke. When dry, another dip is taken and again dried, and so on, until the rubber round the paddle becomes an inch or so thick, or even less. If too heavy to handle, then a knife is taken and a cut made down the rubber into the wood, which enables the product to be taken from the paddle. The rubber, which is then put on one side, is ready for the market. The same process is again repeated until all the rubber has been cured. The process should be slow ; by smoke *only*, not by fire. The difference between Para and African rubber is similar to that between a loaf of bread just made up into dough and a loaf that has been through the oven and been properly baked. In other words, while the substance is the same the one is an imperfect article ; the other a finished one, so far as the production of rubber is concerned.'

SCIENCE NOTES.

Fixation of Atmospheric Nitrogen.

On p. 279 of this volume of the *Agricultural News* we dealt with the subject of the fixation of atmospheric nitrogen by means of chemical agency, stating that experiments conducted in Germany had demonstrated that a substance known as calcium cyanamide could be prepared on a commercial scale and used as a fertilizer.

In his address at the recent meeting of the British Association, Dr. Wm. Somerville, Chairman of the sub-section, Agriculture, dealt at considerable length with this subject. He stated that it had long been the dream of chemists to discover a chemical process, capable of industrial application, whereby the nitrogen of the atmosphere could be made available to supplement the rather limited supplies of nitrogenous manures. Sir Wm. Crookes looked hopefully to electricity to solve the problem. He pointed out that with current costing $\frac{1}{17}d.$ per unit—a rate possible when large natural sources of power, like Niagara, were available—the cost of such artificial nitrate of soda need not be more than £5 per ton. In Germany it had been estimated that the cost of electric nitrate, as compared with Chili nitrate, would be in the proportion of 24 to 39.

That good progress had also been made in another direction in the commercial fixation of atmospheric nitrogen viz., by the preparation of the substance calcium cyanamide, already referred to, was shown by the results published by Professor Gerlach, of Posen.

'So far,' said Dr. Somerville, 'as one might judge from the information available, it would appear that agriculture would not have long to wait till it was placed in the possession of new supplies of that most powerful agent of production, nitrogen.'

Wrapping Fruit. Every year we are learning to put up our fruit with more care. The improvement comes both with the fruit grower and with the consumer. The market is becoming more refined, and customers are willing to pay more for a fancy article put up in a tasteful fashion. The use of the box for shipping apples is a step in this direction, and the wrapping of the individual fruits in paper is another step. Experience this year has shown this last step to be a very important one, for it materially increased the prices realized. (*Southern Planter.*)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 319 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d. Post free, 3s. 3d.

Agricultural News

Vol. III. SATURDAY, OCTOBER 22, 1904. No. 66.

NOTES AND COMMENTS.

Contents of Present Issue.

Our editorial deals with the progress that has been made in the bee-keeping industry in Jamaica. Honey and bees'-wax from Jamaica invariably find a ready sale in the markets on account of their known purity.

The paper on sugar-cane experiments at Barbados (pp. 338-9) is briefly reviewed elsewhere on this page.

On p. 341 will be found brief reports on the prospects of the cotton crop in several of the West India Islands. A short note on the cotton industry in Gambia is also published.

Mr. Henry Powell, formerly of St. Vincent, has sent some interesting notes which are published on p. 342.

Our insect notes deal chiefly with the present position of the efforts to keep the Mexican cotton boll weevil in check by means of the 'kelep' or Guatemalan ant.

The report on cacao experiments at Grenada published on p. 347 is likely to be of interest to cacao planters in the West Indies.

Reviews of two interesting reports will be found on p. 349. These relate to the working of the Agricultural Experiment Stations in Hawaii and Porto Rico.

Mr. J. Russell Murray's report on West Indian produce in Canada shows a satisfactory state of affairs in regard to sugar, bananas, and cocoa-nuts. The abnormally cold weather has spoiled the lime business.

Cotton Industry in the West Indies.

We commenced in the last issue of the *Agricultural News* the publication of a series of brief reports on the prospects of the cotton industry during the present season in the several West India Islands. In the last issue we published the report sent in by Mr. Sands from St. Vincent. Reports from the Virgin Islands, Tobago, Montserrat, and St. Kitts' appear on p. 341 of this number, and we hope to be able to publish the remaining reports in the next issue.

It will be seen that the general tenor of these reports is encouraging and that the local officers of the Department throughout the West Indies are hopeful as to the prospects of the crop.

Emergency Grants for the Cotton Industry.

The British Cotton-growing Association has made a further grant of £300 to meet expenses connected with special emergencies arising during the growth of the present cotton crop in the West Indies. This sum will be supplemented from funds of the Imperial Department of Agriculture.

The emergencies alluded to in particular are such insect and fungoid diseases as may attack the crops, and the object of the grant is to secure extra assistance and instruction in order to meet such emergencies promptly and effectively and to save the cotton crops from the severe injuries that occurred last year.

Of the sum set apart for this purpose £50 have been allotted to St. Vincent and £30 to St. Lucia. In these cases the Agricultural Superintendents have been directed to select and train thoroughly three or four young men to be able to distinguish the common diseases and to know the remedy to apply and the best means of application.

Sugar-cane Experiments at Barbados.

The paper on the sugar-cane experiments at Barbados, by Professor d'Albuquerque and Mr. Bovell, which we publish on pp. 338-9 of this issue, contains interesting observations on five years' work with seedling varieties.

Comparing seedlings B. 208 and B. 147 with the standard variety—the White Transparent—it is found that, as the result of five years' experiments the difference in the case of B. 208 is 5 per cent., and 4 per cent. in the case of B. 147. Although these increases are not to be despised, they do not satisfy the aspirations of the experimenters.

B. 208 has, however, given uniformly good yields, which it owes to the richness and purity of its juice, and a trial of this seedling on a small scale in red soils is urged.

It is pointed out that the crop of 1904 did not turn out as well as was expected of it from the fairly favourable weather conditions during the season. It is probable, however, that this was due to a smaller acreage being now planted in cane on account of land being devoted to other crops, such as cotton, bananas, ground provisions, forage crops, etc.

St. Vincent Arrowroot.

In a leading article the St. Vincent *Sentry* deals with the unsatisfactory condition of the arrowroot industry and urges planters to combine with the object of regulating the production and shipment of arrowroot.

About three years ago a combination was formed and an agreement entered into to limit the output and demand a minimum price of 2*d.* per lb. in the English market. The result was that the price of arrowroot advanced very satisfactorily. Unfortunately, the agreement was signed for one year only, and at the end of the year, the agreement not being renewed, the prices fell back, until now this product is being sold below the cost of production.

Reference might be made in this connexion to the note in the *Agricultural News* (Vol. III, p. 217) in which it was stated that the advice of the *Grocers' Monthly* was that St. Vincent arrowroot should be judiciously advertised.

The Resources of Western Uganda.

In a paper on Western Uganda, read at the Royal Geographical Society by the Rev. A. B. Fisher, reference is made to the natural resources of the districts which are stated to be partially or entirely undeveloped. Almost anything will grow, and the year having only one season, a constant crop of fruit, vegetables, and flowers can be obtained. The coffee is of exceptionally fine flavour, and in the Semliki plain specimens of cotton were seen which were much superior to other kinds produced in the protectorate. 'The present hindrance,' states Mr. Fisher, 'to aggressive industries is the difficulty of transport.'

The rubber industry is absolutely untouched, and in all the forests of these provinces there is a considerable quantity.

The Quality of Coffee.

In his fourth annual report the Agricultural Chemist for the Mysore State, India, makes some interesting observations on the quality of coffee. The old standard of quality was simply the appearance of the bean: now the 'liquoring' of coffee is introduced. Though neither of these methods is as accurate as might be desired, no more reliable method of judging quality is available.

It is not yet known upon what constituent or constituents the quality of coffee depends; with a view, therefore, of throwing some light on this matter, analyses of a number of samples were made. The price obtained for these in the London market was taken as an indication of quality. From the table of specific gravities given it is seen that the heavier the bean, the better the price paid for it. The same holds good as regards the nitrogen contents of the sample, and practically, also, in the case of the percentage of potash and phosphoric acid.

'So far as the results go, they are very satisfactory indeed. But the number of analyses is much too limited to warrant drawing any conclusions. The work will be continued next year, if suitable samples can be obtained.'

Tobacco Experiments in the West Indies.

Considerable interest is attached to the experiments in tobacco culture that are being carried out in the West Indies, especially in Cuba, Porto Rico, and Jamaica. We have referred in the *Agricultural News* (Vol. III, p. 268) to the experiments in growing tobacco under shade in Porto Rico: similar experiments are being conducted in Jamaica.

In the former island, we learn from the recently issued report on the Experiment Station, the experiments have shown that 'under cheese-cloth tents a wrapper of the finest quality can be produced.'

In regard to similar experiments in Jamaica, it is stated in the *Bulletin of the Department of Agriculture* that $\frac{1}{4}$ acre of land was devoted to growing tobacco under artificial shade at the Hope Experiment Station. 'The leaf developed in a very favourable manner, and a crop of a promising quality of Sumatra leaf was successfully grown.' Owing to rapid drying and the absence of special means of controlling moisture in the drying house, the leaf was not successfully cured: the experiment is therefore being repeated.

A full account is given in the *Bulletin* of the method of cultivating tobacco under cloth. It is stated that in Cuba in 1903 there were about 1,000 acres of shade-grown tobacco, in Porto Rico about 250 acres, and in Florida about 2,500 acres. The plan is also being tried in the East Indies.

Agriculture in Brazil.

An illustrated pamphlet on the State of São Paulo, Brazil, recently issued by the Department of Agriculture, gives interesting information and statistics relating to agriculture.

Suitable provision is made in the state for agricultural education. A 'School of practical Agriculture' was established in 1900, which gives a three-year course. There are in addition three other agricultural schools with two-year courses.

Agriculture is the principal source of wealth in the state, coffee holding the first place among the cultivated plants; after it come sugar-cane, cotton, grapes, tobacco, and cereals. Statistics collected by the Department in 1901 show that there are 15,828 coffee estates, occupying over 10,000,000 acres.

The cultivation of sugar-cane is carried on principally for the distilling of 'aquardente' (cane whisky).

Cotton cultivation was at one time in a very flourishing condition, especially between 1867 and 1876, when, besides supplying the home demand, a considerable amount was exported. From that time on, a decadence in cotton culture set in, until now the production is not sufficient to supply the well-developed weaving industry of the state. Lately, cotton culture promises to take a new impetus.

Grape growing for the manufacture of wine is the newest agricultural industry of the state. Through the energy of Dr. Barretto, the problem of grape culture has been solved: he has succeeded in breeding a vine especially adapted to the climatic conditions of São Paulo, which resists all the vine diseases.

INSECT NOTES.

Insects of the Cacao Tree.

Under the title of 'A preliminary Bulletin on Insects of the Cacao,' the Department of the Interior for the Philippine Islands publishes an account of the insects attacking cacao in those islands.

The injuries to cacao in the Far East would seem to be much the same as those of the West Indies, although in most cases the insects causing the injury are not the same. This being a preliminary report, the technical names are not given, and the insecticides recommended for dealing with the pests are general and not the result of experience under the local conditions. The illustrations, of which they are a large number, are mostly from photographs and are very good. Thrips, aphis, borer, leaf-eating caterpillars, ants, termites, and scale insects are all dealt with, and several beneficial insects are also mentioned or described.

This is, perhaps, the first publication on the economic entomology of the Philippines, and will serve an excellent purpose in helping the cacao planters to understand and deal with the cacao pests.

An Enemy of the Mexican Cotton Boll Weevil.

Professor O. F. Cook, of the United States Department of Agriculture, visiting Guatemala in April this year, discovered an ant which destroyed the Mexican cotton boll weevil. This was recognized at once as a very important discovery, since the boll weevil is at present the most serious pest of cotton known (see *Agricultural News*, Vol. III, p. 298).

Reports of this ant and its work were published in certain American newspapers at the time (see *Agricultural News*, Vol. III, p. 204) which, though based on fact, were yet without authentic details, and many extravagant statements were made. Since that time careful investigation has been made by the United States Department of Agriculture and the results have been published in a report on the habits of the Kelep, or Guatemalan cotton boll weevil ant, by O. F. Cook, (*Bulletin* No. 49, Bureau of Entomology).

The following notes are taken from this bulletin :—

The kelep was discovered on cotton on April 20, 1904, at Alta Vera Paz, Guatemala, and its efficiency as a destroyer of the cotton boll weevil (*Anthonomus grandis*, Boh.) was demonstrated the next day. Eighty-nine colonies numbering together about 40,000 ants have been taken to Texas in healthy vigorous condition. Although the journey with the various delays occupied more than a month, scarcely more than a dozen ants died on the way. This indicates that the ants are hardy, and argues well for their successful establishment under new conditions.

The kelep, like many wasps, has the power of stinging its prey and paralyzing it, thus making it easier for them to carry it to the nest.

The introduction of any insect or other form of life to a climate and locality where it is not known is always attended with risk, and many objections are naturally raised. The objections in the present case have been met and disposed of :—

(a) The kelep is entirely carnivorous and predaceous and does not attack plants. It feeds to some extent on the secretions of the honey glands on the leaf of the cotton.

(b) The kelep does not excavate large chambers in the ground to serve as pit falls for men and farm animals. The chambers are deep and consist of narrow passages and tunnels running to a depth of 3 feet.

(c) The kelep never attempts to sting human beings unless actually held or injured, and their sting is neither powerful nor dangerous.

In addition to preying on the boll weevil, the kelep attacks several other insects, the boll worm among them, but so far does not attack the larvae of the lady-birds. It also attacks and kills a large stinging ant which is a serious pest in some parts of Texas.

The kelep is as yet the only ant known to attack and destroy healthy, adult boll weevils, just as the cotton grown with the protection of the ants is the only field culture permanently maintained in the weevil-infested regions of Central America.

The present status of the boll weevil ant investigation may be summarized by saying that three of five crucial questions have been met and answered and that the two others are still to be reached, but with no insurmountable obstacle in sight.

(1) An ant has been discovered in Guatemala which attacks and kills the adult boll weevil, and thus holds this most injurious insect in check and permits the regular harvesting of a crop of cotton, even under conditions favourable to the weevil.

(2) This ant is carnivorous and predaceous; it injures no form of vegetation, and takes nothing from the cotton plant except the nectar secreted for it on the leaves and floral envelopes.

(3) The habits and temperament of the insect are such that it is readily capable of domestication, transportation, and colonization in the cotton fields of Texas.

The issues which remain to be determined are :—

(4) Whether the keleps will survive the winter climate of Texas.

(5) Whether they can be obtained or propagated in sufficient numbers to serve the practical purpose for which they have been introduced.

Scale Insects on Cocoa-nuts.

In his report, referred to on p. 349 of this issue, on plant diseases in Porto Rico, Mr. F. S. Earle makes the following observations on cocoa-nuts :—

Cocoa-nuts are widely planted in Porto Rico. For the most part they seem quite healthy. No trace of either of the serious diseases found in Jamaica * was observed. In the neighbourhood of Ponce many of the trees were yellow and some were dying. Inspection showed that the trouble was caused by scale insects. Fortunately a lepidopterous larva was present in some numbers feeding on the scales. Specimens were secured by Professor Barrett, and it is hoped he will succeed in rearing them. Unless this or some other enemy of the scale multiplies very rapidly, a number of trees in the neighbourhood of Ponce will be lost, as they are badly infested.

* See *West Indian Bulletin*, Vol. IV, pp. 4-6.

DATE PALMS FOR ARBOR DAY PLANTING.

It has been suggested that an excellent tree for planting in connexion with Arbor Day celebrations in the West Indies is the date palm (*Phoenix dactylifera*). An article in the Natal *Agricultural Journal* on 'Some ornamental and useful sub-tropical Trees' has the following reference to the date palm:—

Many specimens of this exist in and around Durban, one well-known tree being that in the garden in front of the Royal Hotel; but though tropical in appearance, it is one of the most hardy palms, fine specimens being in evidence in Capetown, while one at Kat River, Cape Colony, occupies a hot valley just below the Katberg, on which snow often lies for weeks. The date palm luxuriates in hot, dry, desert country, where its roots can strike water—whether fresh or brackish is of little importance. Egypt and Arabia are its native habitat, and there it is said to fruit better in the hot, dry interior than near the coast. Probably the same will be found here, and it may prove more profitable in the hot valleys of the Umkomaas, the Tugela, and the Umfolozi than on the coast, though in growth at least it has thus far done well on the coast. It is dioecious (i.e., the fertile flowers are on separate trees from the male flowers), so several trees should be grown together to ensure fertilization. It grows easily from seeds taken from commercial dates, but the plants grow slowly at first, and seedlings often fail to maintain the reputation they have had in Australia and California of fruiting while quite young. On the Mediterranean coast many named varieties are cultivated having different fruit-forms and different seasons of bearing; the fertile trees of these are propagated and maintained as distinct varieties by the use of suckers, but seedling male trees are satisfactory.

The date palm grows to a height of nearly 100 feet, and will probably be an important article in the drier portions of Zululand. None but seedlings are as yet grown here, but the Government is making an endeavour to obtain suckers of best fruiting kinds from Egypt.

It yet remains to be proved whether dates can be produced on a commercial scale in the West Indies, but there can be no doubt as to the desirability of planting this tree for purposes of ornamentation.

CACAO MANURIAL EXPERIMENTS AT GRENADA.

The following report and table, showing the results of the working of the cacao experiment plot at Nianganfoix estate, Grenada, have been forwarded by the proprietor for publication:—

This plot was handed over on September 30, 1903, by the Department of Agriculture to the proprietor who still carries on the experiments, in order to obtain the highest possible yield from an acre of land by the use of fertilizers and green soiling. *

During the period, extending over four crops, from April 1, 1900, to September 30, 1904, two applications of manures were made, as shown in the table, the first during the first crop 1900-1; and the second application in the spring and summer of 1902 just before the third crop.

'A', the pen manure section, is the wettest section of the plot, and it will be noticed that, notwithstanding the heavy application of manure in May 1902, the yield fell below the two preceding crops, and only recovered after several rods of new drains had been added to those already existing—and dug diagonally across the slope. This illustrates the value of drains in a wet clay soil, without which manure is at a discount.

The potash section 'D' has steadily advanced, and, unlike sections 'B' and 'C,' which unaccountably fell off by $\frac{1}{8}$ to $\frac{1}{4}$ bag, held its own during the crop 1902-3. The cost of production for the first two years averaged £1 per bag of cacao, and for the second two years 12*s.* per bag, or an all-round average of 16*s.* per bag for four years' working.

When the results of the fifth year's working are known, the cost of production will be considerably reduced.

Section.	Manures applied (with dates).	Crop 1900-1.		Crop 1901 2.		Crop 1902-3.		Crop 1903-4.	
		Dry cacao per sectional acre (pounds).	Bags per acre.	Dry cacao per sectional acre (pounds).	Bags per acre.	Dry cacao per sectional acre (pounds).	Bags per acre.	Dry cacao per sectional acre (pounds).	Bags per acre.
A.	June 1900.—Pen manure, 3 baskets per tree, 15 tons per acre. May 1902.—ditto. [Extra drains dug, August 1902].	1,036	5 5/8	868	4 3/8	808	4 1/8	1,184	6 1/8
B.	August 1900.—Basic slag, 8 cwt. per acre. February 1901.—Sulphate of ammonia, 1½ cwt. per acre. May 1902.—Basic slag, 8 cwt. per acre. August 1902.—Sulphate of ammonia, 1½ cwt. per acre.	1,112	6	1,572	8½	1,512	8¼	1,648	9
C.	August 1900.—Basic slag, 8 cwt. per acre. February 1901.—Nitrate of soda, 1½ cwt. per acre. May 1902.—Basic slag, 8 cwt. per acre. August 1902.—Nitrate of soda, 1½ cwt. per acre.	888	4 3/4	1,324	7 1/8	1,309	7	1,492	8
D.	August 1900.—Basic slag, 8 cwt. per acre, and sulphate of potash, 1 cwt. per acre (mixed). May 1902.—ditto.	860	4 3/8	1,472	8	1,488	8	1,612	8 3/4

* The sections have been bedded twice yearly.

GLEANINGS.

The bee keeper who extracts green, raw honey for the market is a foe no less to be dreaded than the adulterator. (Jamaica *Times*.)

Mr. L. R. Mitchell announces that he will undertake to gin and bale cotton for the sum of $\frac{3}{4}d.$ per lb. of lint at his cotton-ginning factory, St. George, Grenada.

Of the exports of Madagascar, India rubber showed an increase of £81,433 in 1903, and raffia fibre of £31,969. The exports of bees'-wax and vanilla both declined in value.

Nitrate to the value of £9,480,507 left the Republic of Chili during the year 1902, which, compared with 1901, gives an increase of £565,998. (*Consular Report* for 1902.)

Complaints have again been made by Messrs. Pink & Sons that some of the crates used for packing bananas at Barbados are too large.

With reference to the note in the *Agricultural News* (Vol. III, p. 296) stating that Hemingway's 'London Purple' Co. wished to purchase cocoa-nuts, it is desirable to mention that the address of the firm is 133, Front Street, New York.

The position of Assistant Instructor in Agriculture in British Guiana, particulars of which were given in the *Agricultural News* (Vol. III, p. 186), has been filled by the appointment of Mr. A. L. Mansfield.

In the *Consular Report* on the trade of Vera Cruz, Mexico, it is stated that growers of sisal hemp have become enormously wealthy. 'Roughly speaking, what costs $1 to produce sells for $4.'

It is suggested by the Acting Superintendent of the Royal Mail Steam Packet Co. that efforts be made to work up a banana trade between Barbados and Paris. Mr. J. R. Bovell announces that he will forward bananas by the R.M.S. 'Catalina,' if so desired by planters.

The total output of sugar and molasses from Barbados during 1904, according to Messrs. James A. Lynch & Co.'s report, amounted to 56,771 tons of sugar and 45,683 puncheons of molasses, as against 38,179 tons of sugar and 30,233 puncheons of molasses in 1903.

According to the *Journal d'Agriculture Tropicale*, all the sisal hemp produced is absorbed by manufacturers in the United States, who pay higher prices than are offered in Europe. The latest quotations are 90 francs per 100 kilos., or about £37 6*s.* 8*d.* per ton.

At a meeting of the St. Vincent Cotton Growers' Association, held on September 28, a letter was read from Sir Daniel Morris advising that bales should be more tightly packed in order to save freight charges.

We learn from the *Mirror* that a consignment of new stock was recently received from Halifax for the Government Stock Farm in Trinidad. The consignment consists of two bulls (Hereford and Guernsey), two Shropshire rams, two Tamworth boars, and two lots of poultry (Plymouth Rocks and Wyandottes).

A correspondent in the Jamaica *Gleaner* dealing with the subject of the yield of coffee trees, states: 'My estimate for a well-pruned, well-kept tree is an average of $\frac{3}{4}$ lb. of cured coffee per tree. This, with 1,200 trees to the acre, would give 900 lb. of coffee, which should net 40*s.* per 100 lb. in London.'

The Hon. T. H. Sharp, discussing with a representative of the Jamaica *Gleaner* the question of the use of locally-grown cotton seed for planting, states that he has come to the conclusion that it will not be necessary to continue importing Sea Island seed provided care be taken to select seed from the largest and best-shaped bolls.

A planter writes from Dominica: 'You were kind enough to supply me with a bushel of "woolly pyrol" seed last April; as these have grown so well and are likely to prove valuable as a green dressing in our cacao fields, I should be glad if you could procure me a couple of bushels of seed, or put me into communication with some party from whom I could purchase it.'

Mr. H. Millen writes from the Botanic Station at Tobago that a bunch of the 'apple' banana, weighing 100 lb., has recently been produced at the station. The plant, which was obtained from the Grenada Botanic Station, received no special attention. The hands are compact and resemble those of the variety known as 'Silk fig.' The fruit is smaller than the 'Gros Michel' but of good flavour.

In Messrs. Gordon, Grant & Co.'s market report for October 5, it is stated that the exports of Trinidad cacao for the year ended September 30 were 221,816 bags as compared with 194,403 bags for the corresponding period in 1903, showing an increase of 27,413 bags. It is also stated that shipments during the year have been fairly well distributed among the principal markets.

According to a bulletin (no. 28) recently issued by the Bureau of Statistics of the U. S. Department of Agriculture, 'The commercial Cotton Crops,' which gives the amounts of cotton imported into Great Britain from all sources for 1895 to 1902, the imports from the British West Indies have been as follows: 1895, 934 bales (of 500 lb.); 1896, 804; 1897, 474; 1898, 642; 1899, 568; 1900, 872; 1901, 700; 1902, 839.

Arrangements have been made with the Syndics of the Cambridge University Press to begin the issue of a Journal of Agricultural Science, under the editorship of Messrs. T. H. Middleton, T. B. Wood, R. H. Biffen, and A. D. Hall, in consultation with other gentlemen. It is proposed to issue the Journal as matter accumulates, aiming at quarterly parts of about 100 royal 8vo. pages. The Journal will publish only definitely scientific work in agricultural science.

HAWAII: ANNUAL REPORT ON THE AGRICULTURAL EXPERIMENT STATION FOR 1903. By Jared G. Smith, Special Agent-in-charge.

Besides the United States Treasury appropriation of $12,000, $600 were derived from the sale of products.

Among the experiments carried on at this station during the year may be mentioned those with corn, potatos, tannias, tomatos, forage plants, tobacco, vanilla, sisal hemp, castor beans, pine-apples, coffee, and cotton.

A number of new varieties of seed-corn were planted, and experiments were conducted in methods of planting, manuring, etc.

It is considered that the outlook for vanilla cultivation is very bright, the plants not appearing to be affected by any of the serious diseases which affect this crop in other countries. An experiment was made in curing and fermenting the pods, which was entirely satisfactory.

The castor oil plant is recommended as a suitable plant for cultivation by small landholders; there is a ready market for the beans in Honolulu.

Pine-apples are grown very satisfactorily in Hawaii, and there is a considerable trade in fresh pines with the Pacific coast which is regarded as capable of extension.

It is evident that a great obstacle in the way of agricultural operations is the injury to crops by insect pests. The entomological work of the station has consequently been of great service to planters.

PORTO RICO: ANNUAL REPORT ON THE AGRICULTURAL EXPERIMENT STATION FOR 1903. By F. D. Gardner, Special Agent-in-charge.

In addition to the United States Congress appropriation of $15,000, the insular legislature passed a special vote of $2,700 for special services. A considerable portion of the latter sum was spent on repairs to buildings, fencing, drainage, etc.

Considerable attention was paid to experiments with leguminous plants for the purpose of securing a plant suitable for enriching the soil and improving its physical condition, and at the same time preventing the severe washing, which takes place on the steep slopes. With alfalfa a good stand was secured and the plants at first made good growth, but afterwards ceased growing and barely managed to survive. No tubercles were formed on the roots. Neither cow peas, soja beans, nor beggar weed gave satisfactory results: the velvet bean did best of all, and of all the leguminous plants tried, this appears to be the most promising.

A large collection of vegetables from northern-grown seed was planted. Most of these gave rather poor results. The tomatos, egg-plants, and potatos were all affected in a similar way by a bacterial or fungoid disease.

Tobacco investigations of a comprehensive character have been carried out, and the services of an expert obtained.

A large collection of economic plants has been assembled at the station. In addition to fruit plants, this includes a number of fibre and rubber plants. Mr. Gardner acknowledges the assistance he has received in this connexion from the Imperial Commissioner of Agriculture and the Superintendent of the Trinidad Botanic Gardens.

The report also contains notes by the Entomologist on a large number of insect pests, while a report by Mr. F. S. Earle gives interesting information on the horticultural possibilities of the island and on plant diseases.

It is apparent from this report that much work of an extremely useful nature is being carried on in Porto Rico, which should considerably increase our knowledge of tropical agriculture.

CASSAVA INDUSTRY IN JAMAICA.

In the *Bulletin of the Agricultural Department*, Jamaica, for September, Mr. H. H. Cousins deals fully with the 'Agricultural basis of the Cassava Industry.' The following summary is of interest:—

Cassava should cost—for cultivation only—£3 13*s.* to £5 2*s.* per acre, according to the locality and circumstances. Rent, interest, and management are excluded from this estimate.

The lower price represents the estimated cost under the most favourable conditions of broad-scale implemental culture; the higher, that of hand labour in rocky land by small cultivators—cassava farming in short.

An average of £4 per acre represents the estimated cost under favourable conditions of estate cultivation.

Yield per Acre.—The data from Longville showed that yields of 6 to 8 tons of tubers were there obtained under somewhat unfavourable conditions.

Mr. Shore gives 8 tons as an average return from Little River lands, and states that he knows lands that give more.

On the other hand, Mr. Calder sounds a note of warning, that he found when growing cassava in St. Elizabeth that it took eighteen months to produce 5 tons per acre. Only experience and local experience can settle this crucial point of the agricultural yield of cassava.

If we can maintain an 8-ton standard, cassava would be a very profitable crop; if, on the other hand, the yield should only be 4 tons per acre, the results would not be remarkable.

Profit.—This depends upon the yield and again upon the price obtainable for the product. I have estimated that an 8-ton crop of cassava giving 5 tons dry meal for shipment to England to glucose makers would yield a profit of £700 to £900 upon a scale of 100 acres. Selling tubers to a starch factory at £2 per ton would mean a profit of £8 to £10 per acre on the same basis.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies left England for Barbados in the R.M.S. 'Trent' on Wednesday, October 12.

The Secretary of State for the Colonies has appointed Mr. C. H. Knowles, B.Sc., Resident Master of the Agricultural School at St. Vincent, to the post of Agricultural Superintendent at Fiji. Mr. Knowles will probably leave St. Vincent for Halifax on October 29.

It is proposed that the next West Indian Agricultural Conference will be held at Port-of-Spain, Trinidad, early in January 1905.

WEST INDIAN PRODUCTS.

Canada.

The following is Mr. J. Russell Murray's monthly report for August on West Indian produce in Canada :—

Fall business has been fairly large. Grain crops are expected to reach the estimate and reaping is now in full operation. Fruit crops are proving ample, especially the apple crop which is very abundant and of fine quality. Under such conditions the autumn trade is likely to be good. The summer has been unusually cool, there being only one short period of warm weather in July : the result has been ruinous to all lemon and lime business.

Sugar.—The continued steady rise during last month from 10*s.* 3¾*d.* for August beet deliveries to 10*s.* 9¾*d.* for September deliveries has been reflected locally by an advance of 10c. per 100 lb. for granulated. West Indian sugars have moderate inquiry, but a better demand is expected before the winter sets in. S.S. 'Degama' has just arrived from Demerara and Antigua with 32,000 bags centrifugals and a small lot of molasses sugars, which, while about 14½ D. S., were sold at $2·70, duty paid. A small cargo by schooner from Barbados arrived a fortnight ago.

Molasses.—Trade has been fairly active in the hands of distributers, deliveries being made to outlying points freely, but importing orders have been few. A small shipment from Barbados is to hand and also a small lot from Antigua, the quality of which is much better than of some previous lots.

Cocoa-nuts.—The New York market has again recovered prices and these are now equal to May quotations. Prices here continue steady with an upward tendency.

Fruit.—Trade in bananas has been very active and prices well maintained. A fair supply of oranges from Jamaica has turned out well and sales are active. Limes are a dead-letter with the present abnormally cold weather : no sales can be made. Good, steady business has been done in Cuban pine-apples.

Spices.—During the latter end of August there was more inquiry, but general business was quiet. Pepper and cloves have advanced.

INQUIRIES, NOTES, ETC.

Sugar.—I am open to receive firm offers of centrifugal crystals 96°, basis of 14½ to 15½ D. S., shipment direct to Montreal, offers to be quoted c. & f. I can also place yellow crystals, and would be glad to have offers of same. I can place good bright grades of muscovados, offers need not be confined to those under 16 D. S. Sugars must be dry and free from footings. With regard to molasses sugars, in bags of 14 D. S. and upwards, offers are required c. & f. Montreal for 1,000 bags. In all cases send postal sample to indicate average grade.

Cocoa-nuts.—Offers wanted of up to 50,000 per month. Size, minimum, 3¾ inches in diameter, and of not less than 130 lb. gross per bag of 100 nuts : shipment via Halifax. Quote c. & f. per 1,000.

Oranges.—Consignments of these will receive every attention.

THE WEST INDIES AND THE INTERNATIONAL FOOD EXHIBITION AT THE CRYSTAL PALACE.

The stand of Messrs. James Philip & Co. (Pure Cane Sugar Co.) 4, Fenchurch Buildings, E.C., was unanimously declared to be the most interesting in this Exhibition, being described by more than one old West Indian as the most complete collection of West Indian produce they had ever seen in England. The exhibit comprised sugar, sugar-canes, syrup, turtle, guavas, guava jelly, cassava cakes, cassareepe, pickles, sauces, arrowroot, cigars, rum, fresh limes, yams, sweet potatos, etc., etc., added to which were shown preserved specimens of cacao pods, coffee, etc. The interest shown by the public in the stand amply proves how keen an interest is taken in colonial produce, and how much good may be done to colonial industries by well-organized efforts to put such things directly before the consumer. It is worthy of note that Messrs. Philip & Co. were the first to introduce the system of packing 'cane' sugar in small bags for household purposes. The Exhibition jury gave them the exceptional award of two gold medals for their exhibit of cane sugar and other West Indian produce.

At the great Colonial Exhibition to be held next year in the Crystal Palace, Messrs. Philip & Co. are applying for space, and they would be glad to try and make arrangements by which they might undertake the exhibition or sale of any West Indian produce entrusted to them. As this exhibition will remain open five months, and will doubtless be visited by great numbers of people, it should be a splendid opportunity for bringing such goods directly before the British public, and creating a more widespread and general demand for cane sugar and other things.

EDUCATIONAL.

Nature Teaching.

The *Cyprus Journal* for July, has the following review of this Department's publication, *Nature Teaching* * :—

One of the most intelligible and instructive educational manuals that we have yet come across is *Nature Teaching*, by Francis Watts, F.I.C., F.C.S., Government Analytical and Agricultural Chemist, Leeward Islands, a copy of which has just reached us. It has been compiled especially for the use of schools, and although the information is stated to be specially suitable for the West Indies, it treats mostly of those general elementary laws of nature which are of world-wide application.

Each chapter is divided into two parts. No. 1, explanatory and descriptive, while No. 2 is in each case headed 'Practical Work,' and this is the distinctive feature of the book, and from this it derives its chief utility.

The chapter on 'Plant food and Manures' deals with this subject in an exceptionally clear and simple manner, and explains the differences and the uses of the leading artificial or chemical manures in a way that could be understood by every average schoolchild.

There is added a useful glossary of technical words in common use, e.g., albumen, bacteria, capillary, nitrification, pistil, and so forth ; and an appendix gives lists of tools and appliances needed for school gardens.

We strongly recommend it to the attention of schoolmasters and others desirous of instructing themselves or their children in the elementary operations of nature.

* Issued under the authority of the Commissioner of Agriculture for the West Indies. To be obtained of all agents of the Department. Price, limp cloth, 2*s.*, or in a superior style of binding, 2*s.* 6*d.* Postage in either binding, 3½*d.* extra.

MARKET REPORTS.

London,—September 27, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 23; and 'THE PUBLIC LEDGER,' September 24, 1904.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* per lb.
BALATA—Block, 1/3 per lb.
BEES'-WAX—£7 10*s.* to £7 12*s.* 6*d.* per cwt.
CACAO—Trinidad, 57/- to 61/- per cwt.; Grenada, 53/- to 56/- per cwt.; Dominica, 48/6 to 54/- per cwt.; Jamaica, 53/6 to 57/- per cwt.
CARDAMOMS—Mysore, 7½*d.* to 2/- per lb.
COFFEE—Jamaica, good ordinary, 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 13*d.*; fine, 14*d.*; extra fine, 16*d.* per lb.
FRUIT—
BANANAS—Jamaica, 2/- to 4/- per bunch.
GRAPE FRUIT—12/- to 13/- per box of 150-200.
ORANGES—Jamaica, 6/- to 8/- per case.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Fair bright, 37/6; common to middling, 29/- to 37/6 per cwt.
HONEY—Jamaica, 16/- to 22/- per cwt.
ISINGLASS—West Indian lump, 2/5 to 2/10; cake, 1/2 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 1/4 per gallon; concentrated, £13 15*s.* per cask of 108 gallons.
LIME OIL—Distilled, 1/6 per lb.; hand-pressed, 2/6 to 2/9 per lb
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—Good bold pale, 1/6; red 1/2 to 1/3; broken, 1/- to 1/2 per lb.
NITRATE OF SODA—Agricultural, £10 7*s.* 6*d.* per ton.
NUTMEGS—71's, 1/3; 90's, 11*d.*; 155's, 5½*d.*; shell, 5½*d.* per lb.
PIMENTO—2⅝*d.* per lb.
RUM—Demerara, 7*d.* to 8*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
SARSAPARILLA—No quotations.
SUGAR—Crystallized, 17/6 to 19/- per cwt.; Muscovado, Barbados, 14/- to 14/6 per cwt.; Molasses, 12/- to 16/- per cwt. (wanted).
SULPHATE OF AMMONIA—£12 per ton.

Montreal,—September 9, 1904.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

BANANAS—Jamaica, 75c. to 95c. per bunch of 8 hands; $1·05 to $1·15 per bunch firsts; $1·40 to $1·50 per bunch Jumbos.
CEDAR—Trinidad, 40c. per cubic foot.
COCOA-NUTS—Jamaica, $25·00 to $27·00; Trinidad, $21·00 to $23·00 per M.
COFFEE—Jamaica, medium, 9c. to 10c. per lb.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per lb.
LIMES—Jamaica—No quotations.
MOLASCUIT—Demerara, $1·32 per 100 lb.
MOLASSES—Barbados, 24c. to 26c.; Antigua, 20c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. to 19½c. per lb.
PIMENTO—Jamaica, 6¼c. to 7c. per lb.
PINE-APPLES—Cubans, crates 36's to 10's, $3·00 to $4·10.
SUGAR—Grey Crystals, 96°, $2·60 to $2·70 per 100 lb.
—Muscovados, 89°, $2·30 to $2·60 per 100 lb.
—Molasses, 89°, $2·15 to $2·30 per 100 lb.
—Barbados, 89°, $2·40 to $2·45 per 100 lb.

New York,—September 30, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12¼c. to 13c.; Jamaica—No quotations; Grenada, 12c. to 12¼c.; Trinidad, 12c. to 13c. per lb.
COCOA-NUTS—Trinidads, $30 per M., selected; Jamaicas, $35·00 to $37·00 per M.
COFFEE—Jamaica, good ordinary, 8¾c. to 9c. per lb.
GINGER—Jamaica, good grinding, 7¼c. to 8¼c.; per lb.
GOAT SKINS—Jamaicas, 54c. per lb.
PIMENTO—4⅞c. per lb., spot quotation.
SUGAR—Centrifugals, 96°, 4¼c. to 4 5/16c.; Muscovados, 89°, 3¾c. to 3 13/16; Molasses, 89°, 3½c. to 3 9/16c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—October 8, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·50 to $3·60 per 100 lb.
CACAO—Dominica, $13·50 per 100 lb.
COCOA-NUTS—$13·50 per M. for husked nuts.
COFFEE—Jamaica, $10·00 to $10·50; ordinary Rio, $12·00 per 100 lb.
HAY—95c. to $1·00 per 100 lb.
MANURES—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
ONIONS—Madeira (stringed), $2·25 to $2·05 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, $1·86 to $2·16 per 100 lb.
RICE—Ballam, $4·75 per bag (190 lb.); Patna, $3·40 per 100 lb.

British Guiana,—October 6, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $7·50 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—$6·00 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 13½c. to 14c. per lb. (retail).
—Creole, 11c. per lb.
DHAL—$4·25 per bag of 168 lb.
EDDOES—84c. to $1·00 per barrel.
MOLASSES—Vacuum Pan yellow, 15½c. per gallon (casks included).
ONIONS—Madeira, $1·90 to $2·00 per 100 lb.; Teneriffe, $1·50 to $1·75 per 100 lb.
PEA NUTS—American, 7c. per lb. (retail).
PLANTAINS—16c. to 32c. per bunch.
POTATOS, ENGLISH—Nova Scotia, $1·00 per 100 lb. (retail).
RICE—Ballam, $4·40 to $4·45; Creole, $4·50 per 177 lb., ex store.
SWEET POTATOS—Barbados, $1·44 per bag; $1·68 per barrel.
TANNIAS—$2·16 per barrel.
YAMS—White, $2·40 per bag.
SUGAR—Dark Crystals, $2·50 to $2·51; Yellow, $2·90 to $3·00; White, $3·50 to $3·75; Molasses, $2·00 to $2·25 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75 and $5·50 per M.

Trinidad,—October 6, 1904.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, $12·25 to $12·30; Estates, $12·40 to $12·60; Venezuelan, $12·30 to $12·80 per fanega (110 lb.).
COCOA-NUTS—$19·00 per M., f.o.b.
COCOA-NUT OIL—77c. per Imperial gallon (casks included).
COFFEE—Venezuelan, 7¾c. per lb.
COPRA—$3·00 per 100 lb.
ONIONS—$1·25 to $1·30 per 100 lb.
POTATOS, ENGLISH—$1·25 to $1·70 per 100 lb.
RICE—Yellow, $4·10 to $4·40; White Table, $5·25 to $5·50 per bag.
MOLASSES—Market closed.

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(VOL. IV, NO. 4.),

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 67. BARBADOS, NOVEMBER 5, 1904. PRICE 1*d.*

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West Indian Agricultural Conference.

AS briefly aunounced in the last issue of the *Agricultural News*, it is proposed to hold the next West Indian Agricultural Conference in Trinidad from about January 4 to January 13, 1905.

Trinidad possesses special advantages as a meeting place for the leading authorities connected with West Indian agriculture, as those selected to attend would have opportunities for obtaining information likely to be of great benefit to their respective colonies. Not only will Trinidad afford welcome opportunities for the study of the cacao and sugar industries, but the colony possesses several institutions where important agricultural work is being carried on.

The Royal Botanic Gardens are amongst the oldest in this part of the world, and contain interesting collections of trees and other economic plants. A successful Experiment Station for sugar-cane, rubber-yielding trees, coffee, cacao, etc., has been established in recent years at St. Clair, while the Government Stock Farm in the parish of St. Joseph is also likely to prove of interest to the representatives. It may be possible, too, for a visit to be paid to the large Central Sugar Factory that is in full working at St. Madeline, near San Fernando, several cacao plantations whose produce obtains the highest prices in the European markets, and the local cotton experiment stations.

Taking into consideration all these advantages, there is no doubt that the Conference of 1905 will be no less useful than former Conferences. It would be of advantage if those who are likely to attend would give careful consideration to such subjects as it may be desirable to bring forward.

As mentioned in the *Agricultural News* (Vol.

II, p. 274), in discussing the possibility of holding a Conference last year, there are a number of important subjects that are likely to be brought before the Conference for discussion. Since the last Conference—that of 1902—the subject of cotton growing in the West Indies has been brought prominently before planters and must naturally occupy an important place. Another subject in which several of the colonies are directly concerned is the onion industry. Then again, considerable attention has been devoted to the efforts to establish a fruit trade between several of the islands and the United Kingdom. The efforts of the Symington Syndicate in Trinidad are in particular likely to afford material for discussion. Other subjects desirable to be ventilated are the cultivation of the best rubber trees, the cultivation of cassava as a source of starch, the improved cultivation of cacao, in view of the increased production of African cacao, the cultivation of ground nuts for the production of oil and ground nut meal, the improvement of the bay oil industry, and many others.

A further subject suggested to be dealt with is the best means for checking 'Prædial larceny,' that is, the theft of growing crops. A good deal has been written in regard to this, but it would appear that we are as far as ever from solving all the difficulties connected with it. It might be of considerable advantage if we could ascertain exactly what is the position in dealing with prædial larceny in the several colonies; and a review of the laws, as they now stand, and the extent to which their provisions are enforced, might serve as a useful basis for discussion.

If the question of dealing with prædial larceny is to be discussed at all at the forthcoming West Indian Conference, it is hoped that those attending it will be duly prepared beforehand and that they will be in a position to join in recommendations of a practical character for getting rid of one of the most retarding influences associated with agricultural development in the West Indies.

Exports of Gambia. As stated in the last issue of the *Agricultural News*, the principal item of export from Gambia is ground nuts. In 1903 the export of these showed an increased value of £81,909. Over 90 per cent. of the nuts were shipped to France. The only other item under exports showing an increase, according to the *Annual Report*, is hides. There were decreases in the exports of rubber (due to tappers having to go farther afield to collect it and to their taking it to the French port of Cassamance), and in the exports of palm kernels and bees'-wax. The exports of bees'-wax were 38,640 lb. of the value of £1,589.

SUGAR INDUSTRY.

Naudet Process for Extracting Cane Juice.

The following reference is made in the *Consular Report* on the trade of Madeira for 1903 to the sugar industry and particularly to the patent Naudet process for extracting and purifying cane juice, a complete account of which was given in the *West Indian Bulletin*, Vol. V, no I:—

The cane crop of 1903 was exceptionally short, owing to want of rain at the proper season, and also to a fungoid disease which attacked all qualities of cane about one month before reaching maturity. The only exception is the 'Yuba' cane, which has up to the present resisted the disease, and there is no doubt whatever that in two or three years' time this cane will be universally grown in the island.

The entire cane crop of Maderia was roughly estimated at 19,000 tons, valued at £56,000, of which 6,000 tons were converted into sugar and the remainder into cane spirit for local consumption. It is early to say what the result will be of the seedling canes imported from Barbados, but at present they do not appear very flourishing.

All the cane turned into sugar was manufactured by the Hinton-Naudet process, being an improvement on the Naudet process, and the results were remarkable. During the 1903 season all the juice or saccharine matter was extracted from the cane with a loss of 36 per cent. of the total sugar contained in the cane, and this juice was obtained in nine-tenths of its original density. This process has made quite a sensation in the sugar world, and during the 1904 season, which is just over, planters from Trinidad, Demerara, and Réunion came to Madeira to inspect it. I am informed that a large plant to treat 600 tons of cane per day is now being made in Glasgow for Trinidad. Should the advantages claimed for this process by the inventors be true—and I am told they have been demonstrated by practical experience—there is no doubt that it will revolutionize all over the world the manufacture of sugar from cane.

Manurial Experiments at Barbados.

In the last issue of the *Agricultural News* a summary was published of the results of experiments with seedling canes at Barbados, as given by Professor d'Albuquerque and Mr. Bovell in their paper read before the Agricultural Society on October 14. In the same paper the following summary of the results of manurial experiments was given:—

The manurial experiments were carried on at Dodds plantation and Foursquare plantation, St. Philip, and Hopewell plantation, St. Thomas. In addition to these, fields of large manurial plots, of the approximate area of 1 acre each, were reaped at Hampton, Foursquare, and Ruby St. Philip, and Blowers, St. James.

It is estimated by one of us that in 1904 the average price of a ton of muscovado sugar and its molasses was $50·87, that the cost of reaping and manufacture is $1·30 per ton of cane, and that 13½ tons of cane are required for the manufacture of 1 ton of muscovado sugar. According to this estimate, the value of a ton of cane in the field was $2·46.

The experiments at Dodds were in continuation of those carried out on similar lines since 1892. The field received an application of 20 tons of farmyard manure per acre, and the most favourable result was obtained on the plot that received minerals (80 lb. phosphate as superphosphate, and 60 lb. potash as sulphate of potash) in January, and 60 lb. nitrogen as sulphate of ammonia in June. The increase over the plot that received no chemical manure was 8½ tons cane, and at $2·46 per ton was worth $20·91. Deducting the cost of manuring, $15·48, leaves a profit, by manuring, of $5·43 per acre. The experiments indicated a gain by manuring with nitrogen and potash, but a loss by manuring with any form of phosphates, and they also indicated that a further profit would have accrued had phosphates been omitted.

At Foursquare the field received an application of 35 tons of farmyard manure per acre. This application is in excess of that generally used except when the fields are intended to be ratooned. It would be expected that, as a result, the effects of chemical fertilizers would be minimized. As a matter of fact the results indicate that 60 lb. nitrogen as sulphate of ammonia gave an increase of 5 tons cane at $2·46, worth $12·30. The cost of the manure being $9·70, the profit by the application of sulphate of ammonia was $2·70. 100 lb. phosphate as superphosphate gave a further increase of 2 tons cane, worth $4·92; cost of manure, say, $3·00; profit $1·92. 100 lb. potash as sulphate of potash gave an increase of 1·7 tons cane over no potash, worth $4·18; cost of potash, say, $5·80; loss, $1·62. Total profit by manuring with, say, 250 lb. superphosphate in January, and 300 lb. sulphate of ammonia in June and July, $4·62.

At Hopewell plantation an experimental field of plant canes, and one of ratoons were reaped. Each field being destined for ratoons received 40 tons per acre of farmyard manure. The plots that received 40 lb. nitrogen as sulphate of ammonia in June, and 50 lb. phosphate as superphosphate, and 50 lb. potash as sulphate of potash in January, gave an increase of 5 tons of cane over the no chemical manure plots. This was worth $12·30; cost of manure, $10·80; profit by manuring, $1·50 per acre.

The plots on Fletcher Field were reaped as plants in 1903 and ratoons in 1904. The plots that received each year no phosphate, but 50 lb. potash as sulphate in 1902 and 1903 (total 100 lb. potash) and 60 lb. nitrogen as sulphate of ammonia in 1902 and 1903, gave in comparison with the no chemical manure plots the following results:—

		1903.	1904.
No chemical manure		15·39	15·38
Chemical manure as above ...		17·63	32·16
Increase tons of canes		2·24	16·78
2·24 tons cane at $1·67	$3·74		
16·78 „ „ „ $2·46	41·28		
Total per acre, two years	45·02		

Cost of manure, $25·00; profit two years, $20·02; average annual profit, $10·01.

The results indicate also that the potash might have been omitted during the first year, with at least equal, if not more, favourable results leading to a slight additional profit.

LARGE PLOTS.

All the fields were heavily manured with farmyard manure. At Hampton, on one field, 200 lb. sulphate of ammonia gave an increase of 5 tons cane over no nitrogen, worth $12·30; cost of sulphate of ammonia, say, $6·40; profit, $5·90.

On another and more fertile field the no nitrogen plot gave higher results, and in this case an application of 400 lb. of sulphate of ammonia gave an increase of 4 tons over the no nitrogen plot, worth $9·84; cost of sulphate of ammonia, say, $12·89; loss by manuring, $2·96. The increase by manuring therefore on a very fertile field was much less than on a less fertile field, both having been manured with heavy applications of farmyard manure, and an ordinary application of mineral manure.

Foursquare.

No phosphate plots	33·5	tons cane
250 lb. basic slag...	35·00	
Increase	1·50	tons cane

worth $3·69; cost of basic slag, say, $3·00; profit by phosphatic manure, $0·69.

Blowers.

Phosphate plots. These plots showed a loss by the use of phosphatic manure.

Ruby.

Potash plots.	No potash, average tons canes ...	35·00
	100 lb. sulphate of potash ...	37·50
	Increase tons of canes	2·50

worth $6·15; cost of manure, say, $2·90; profit by manuring with sulphate of potash, $3·20 per acre.

On the whole, the results confirm previous conclusions that nitrogenous manures were the most important, and in nearly all cases profitable; that sulphate of potash gave increased returns which, however, were in one instance not large enough to pay the cost of the manure. That in the case of some soils, the application of phosphate led to increase of yield and profit, in the case of other soils it led to no increase or even diminution of yield, and loss of money.

The question of profit or loss by manuring depended also upon the current price of sugar.

These results were obtained on land that received liberal application of farmyard manure. Previous results indicate that in the absence of farmyard manure and probably also when farmyard manure is supplied in insufficent amounts, all these forms of fertilizers would give larger increases.

In the case of ratoons, the results indicated that, looking to the large application of farmyard manure, nitrogen was alone necessary in the first year, and that the most favourable applications to the ratoons were 100 lb. sulphate of potash and 200 lb. sulphate of ammonia in June, and 1 cwt. of nitrate of soda as soon as the stools began to spring.

RUBBER IN THE GOLD COAST COLONY.

The following extracts from the *Annual Report* on the Gold Coast for 1903 relating to rubber cultivation are of interest:—

Samples of Para rubber (*Hevea brasiliensis*) and African rubber (*Funtumia elastica*), grown in the gardens at Aburi, in comparatively poor, stony soil, were sent to the Government Chemist at Lagos for analysis and produced highly satisfactory results. The Para rubber was reported on by English brokers and found to be quite as good as that exported from Ceylon.

The Central American rubber (*Castilloa elastica*) has not produced satisfactory results, the soil at Aburi not appearing to suit it.

In the rich, low-lying hands at Tarkwa, better results are likely to be obtained from all the species, and 6,000 Para plants have already been raised there from seed sent from Ceylon.

WEST INDIAN FRUIT.

TOBAGO PINE-APPLES.

The Trinidad *Bulletin of Miscellaneous Information* contains the following notes on a collection of local varieties of pine-apples sent from Tobago:—

No. 1. Local name—'Black Antigua.' True to name. This variety is also known in England as 'Ripley Queen,' and there is a lighter-leaved variety, known as the 'White Ripley,' bearing fruit of the same class. When in good order there are few pine-apples to beat this variety for flavour.

No. 2. No name. A pine resembling the Smooth Cayenne by its smooth leaves only. The form and flavour of the fruit differ. It is much nearer to a variety known in Jamaica as 'Black Pine' or 'Black Jamaica,' but is not the same. It is a desirable variety.

No. 3. Local name—'Grass Pine.' Resembles very much, if not identical with, the Jamaica 'Cowboy.' It is an excellent pine of good flavour.

No. 4. Local name—'Sugar Loaf.' Not the 'Sugar Loaf' of Jamaica, but more like one called 'Bull Head,' but better in flavour. A pine well worth growing. It appears to resemble very closely the pine known in Trinidad as the 'La Brea,' or Pitch Lake pine, but has not the form of a sugar loaf.

BANANAS AND PINE-APPLES IN PORTO RICO.

The following note on the prospects of the banana and pine-apple industries in Porto Rico is taken from the report by Professor F. S. Earle appended to the Annual Report on the Agricultural Experiment Station:—

The horticultural crops now attracting most attention in Porto Rico are oranges and pine-apples. Bananas are grown extensively, but mostly in the interior, where difficulties of transportation would prevent their becoming an article of export. Some of the lowlands near the coast are well adapted to the culture of bananas, and there seems no reason why they could not be grown there profitably for the United States market. At present the subject seems to be receiving no attention. To develop successfully this, or in fact any other, branch of the fruit business, better transportation facilities will be necessary. The present steamer service is poorly adapted for the transportation of perishable fruits.

Pine-apples thrive in many parts of the island. The finest ones seen were in the neighbourhood of Lajas, south-east of Mayaguez. A number of acres are grown here for the Mayaguez and Ponce markets. Some have been shipped to the States, but usually with unsatisfactory results, and the impression prevails that Porto Rican pines do not ship well. This is not remarkable when we remember that they are hauled in bulk often 15 miles in ox carts over a very rough road before being packed for shipment. Under these conditions it would be indeed astonishing if any arrived in good condition. The completion of the railroad now building between Mayaguez and Yauco will make it possible to deliver these at the seaboard in good condition, when their shipping qualities can be fairly tested. There is now a considerable planting of pines in the neighbourhood of San Juan. Some shipments from this region are reported as proving satisfactory and as carrying well. I see no reason why the growing of pines should not become a large and profitable industry. A small canning factory has been established at Mayaguez, which, if successful, will lead to a largely increased home market. Pine-apples seem very healthy in Porto Rico. No diseases or serious insect pests were observed.

SAMPLES OF CACAO.

Excellent samples of the following kinds of commercial cacao have been received by the Imperial Commissioner of Agriculture from Messrs. Rowntree & Co., Ltd., of York:—

Common Unfermented Cacao:—
Accra. Jamaica.

Average Quality Fermented Cacao:—
Dominica. Grenada.
Jamaica. Bahia. Surinam.
African. Congo. Camaroon.

Trinidad:—
San Antonia.

Guayaquil:—
Superior Summer Arriba. Machala.

Para:—
Para Sertao.

Venezuela:—
Unclayed Caracas. Finest Puerto Cabello.

Ceylon:—
Best Ceylon.

The samples of Dominica and Jamaica were prepared by ourselves, and were valued by a London Broker at 57*s.* 6*d.*, the market price of Fine Grenada being 58*s.*-59*s.* at the time.

It may be mentioned that on August 17 last the Imperial Commissioner of Agriculture spent the day at the works of Messrs. Rowntree and was kindly received and shown every detail in the manufacture of cocoa.

COTTON INDUSTRY.

Barbados.

Mr. J. R. Bovell, has reported as follows on the prospects of the cotton crop at Barbados:—

I beg to inform you that 8,826 lb. of Sea Island cotton seed have been distributed to date, of which 503 lb. are seed selected from that obtained from cotton which realized the highest prices in the Manchester market this year.

Of the total quantity, 814 lb. have been sent to the other islands, etc., leaving 8,012 lb. of seed as the quantity purchased by local residents for planting.

In addition some of the planters have been planting their own seed, and from all I can gather, I estimate that about 1,600 acres of cotton will be planted this season.

I am glad to say that, so far, hardly any insect pests, except plant lice (*Aphidae*), have been noticed, and in nearly every instance where caterpillars have appeared the cotton has been promptly dusted with Paris green and lime.

At the present time the young cotton crop is all that can be desired, and with favourable weather, and the absence of insect or fungoid pests, the crop next season is likely to be a good one.

St. Lucia.

The Rev. L. Barlow, Acting Agricultural Superintendent at St. Lucia, writes as follows on the prospects of cotton growing in that island:—

After a most careful inspection of the entire cotton cultivation of the island, in company with Mr. Ballou, I estimate the area at from 60 to 70 acres. Of this area the greater amount is ratoon cotton of the 'degenerate Sea Island' type. Up to the present time 171 lb. of seed have been sold; we are expecting to have immediate orders for seed for the new areas that are just being put under cultivation.

Mr. Ballou's visit has had the immediate effect of awakening an interest in the industry, and I think that at least 30 acres more are being put under cultivation for Sea Island cotton for the present season.

Anguilla.

Mr. F. R. Shepherd, Acting Agricultural Superintendent at St. Kitt's, has furnished the following information in regard to the prospects of the cotton crop in Anguilla:—

The approximate area planted in cotton in Anguilla for 1904 is 250 acres. Of this area about 70 acres were planted with selected Sea Island seed, and the remainder with other Sea Island seed.

According to information received from Dr. J. N. Rat and Mr. C. Rey, the cotton is looking well, but the young plants have been damaged by attacks of beetles,* specimens of which were forwarded to you on October 4.

Dr. J. N. Rat, Magistrate of Anguilla, writing on the same subject, states that the Government has sold 520 lb. of cotton seed to four persons in the island and has distributed 300 lb. gratis. In addition sufficient seed has been distributed by other persons to plant between 100 and 200 acres.

* One of these was a black ground beetle, common throughout the West Indies, technically known as *Hopatrinus gemellatus*. The other is a small, greyish weevil, not yet identified. [Ed. *A.N.*]

Sea Island Cotton Crop.

The following extract is taken from the 'Annual Sea Island Report' issued by Messrs. W. W. Gordon & Co., dated Savannah, Georgia, U.S.A., September 15:—

The high price of Uplands in March and April induced a considerable transfer of acreage in Georgia from Sea Island to Upland cotton. This decreased acreage is conservatively estimated at 20 per cent. In Florida and South Carolina the acreage planted was about the same as in the previous year. An early stand was obtained and the weather was favourable until July. Since then there has been too much rain, which has caused shedding and rust and has somewhat delayed the maturing and marketing of the crop. In Florida and some parts of Georgia caterpillars have been more numerous and destructive than for the last ten years. Very little Florida cotton has arrived: the Georgia receipts have been generally of excellent body and staple but not brilliant in colour. Crop estimates are for a crop of 90,000 bales, if no killing frost occurs before the end of November: but all crop estimates are merely guesses thus early in the season. The average crop for the last ten seasons, 1894-1903 inclusive, was 85,650 bales.

World's Production of Fine Cotton.

The following diagram has been prepared for use in connexion with addresses on cotton in the West Indies:—

Varieties.	Weight of bales (pounds).	Range of prices.	World's production (bales).	Probable production in W.I. in 1904-5 (bales 360 lb. each).	Probable total value (sterling).
Sea Island (S. Carolina)	360	13*d.* to 32*d.*	10,000	= 1,500 †	£30,000
Florida (S. I.)	420	12*d.*	80,000	= 2,500 †	£50,000
Georgia (S. I.)	420	11*d.*			
Egyptian (Extra Fine.)	500	9-10½*d.*	20,000	= 1,000 †	£20,000
Total			110,000	5,000	£100,000

Note—Production in West Indies to total production less than 5 per cent.

† No Florida, Georgia or Egyptian cotton has been planted in any quantity in the West Indies. The above figures are intended to represent only grades of quality equivalent to the cotton from the countries named.

Sea Island v. Upland Cotton. A correspondent in one of the Northern Islands, who has hitherto been in favour of planting Upland cotton instead of Sea Island now writes:—'I am quite converted to the planting of Sea Island cotton, so much so that I am planting 5 acres myself this month and expect to increase to 50 acres next year. There is money in it on the right soil and with good cultivation. Our average crop of Sea Island cotton this year will be between 200 lb. and 250 lb. of clean lint per acre.'

SCIENCE NOTES.

Thorn Apple.

The thorn apple or 'Jimson weed,' as it is called in America, is a common weed in Barbados and in other West India Islands. The botanical name of the plant is *Datura Stramonium*, and it belongs to the same Natural Order (*Solanaceae*) as the tobacco, tomato, English potato, Petunia, etc.

Not only is the thorn apple a common weed in the West Indies, but it occurs all over the world in warm, and even in some temperate, regions.

The plant is somewhat coarse-growing, reaching a height of 2 to 3 feet; it branches vigorously and the branches spread

Fig. 13. Datura Stramonium. Branches with Flowers and Fruit.
[From *Dictionary of Gardening.*]

out widely, so that a single plant will cover quite a large area. The leaves are large and ovate with toothed margins (fig. 13). The flowers also are large and distinctly ornamental. The corolla is funnel-shaped, about 6 to 8 inches long, and generally pure white in colour. Other species of the genus, for example, *Datura fastuosa*, are often found in gardens as ornamental plants.

The fruit (fig. 14) is a capsule which is covered with

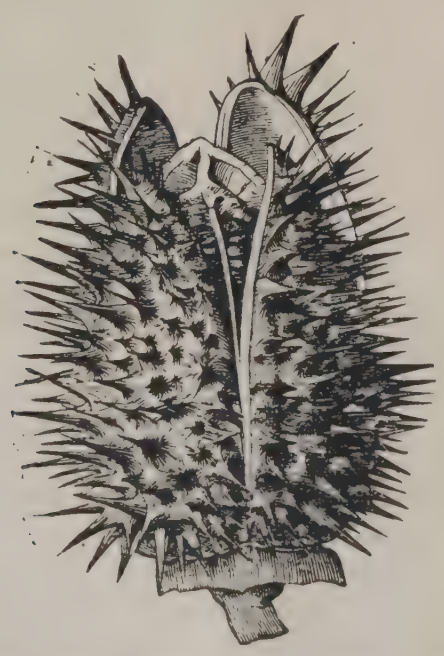

Fig. 14. Mature Fruit of Datura Stramonium.
[From *Dictionary of Gardening.*]

the stout spines that give to the plant its common name of thorn apple. It opens by four valves.

The plant is exceedingly poisonous, containing the alkaloids known as atropin and hyoscyamin. These occur in all parts of the plant, but the seeds are especially poisonous. The effects of the poison are somewhat similar to those of belladonna: small quantities are sometimes used medicinally in cases of neuralgia, epilepsy, mania, etc. In India and China the seeds of an allied species are used by poisoners. The Peruvians are said also to prepare an intoxicating beverage from the seeds which induces stupefaction and furious delirium if partaken of in large quantities.

Nitragin.

In his address as President of the Sub-section Agriculture of the recent Cambridge meeting of the British Association, Dr. Somerville made the following remarks regarding the artificial inoculation of soils with organisms from the nodules of leguminous plants:—

A few years ago much interest was excited in this and other countries by the announcement that the scientific discoveries of Hellriegel and Wilfarth had received commercial application, and that the organisms of the nodules of the roots of *Leguminosae* could be purchased in a form convenient for artificial inoculation. The specific cultures placed upon the market were largely tested practically and experimentally, but the results were such as to convince even the patentees, Nobbe and Hiltner, that the problem which promised so much for agriculture had not been satisfactorily solved. Since that time, however, investigators had not been idle, and the present position of the subject was to be found in a recent report by Hiltner and Störmer. The nitragin put on the market a few years ago was used in two ways, being either applied directly to the fields, or mixed with water and brought into contact with the seed before sowing. Under the former method of procedure, an increase of crop was obtained only when the nitragin was used on land containing much humus. The explanation given for failure under other conditions was that the bacteria artificially introduced perished for want of food before the leguminous seed germinated and produced plants. Failure of the nitragin to effect an improvement in the crop when it was sprinkled on the seed was now believed to be due to the action of secretions produced by the seed in the early stages of germination. This difficulty was found to be got over by moistening the seed and allowing it to sprout before the nitragin was applied; but manifestly such a procedure would always be difficult, and often impossible, to carry out in practice. The object, however, would appear to have been gained in another way, namely, by cultivating the bacteria in a medium that imparted to them the necessary power of resistance. Such nourishment might take various forms, but that which gave the best results consisted of a mixture of skim-milk, grape sugar, and peptone, and it was in this medium that the organisms of the nitragin now distributed were cultivated.

Ram Goat Wanted. A correspondent in Barbados writes: 'I have an inquiry from Demerara for a young ram goat of good milk strain.' Any person having for sale a ram goat of good breed, preferably one of the offspring of this Department's 'Black Rock' or 'Bruce,' should communicate full praticulars to the Imperial Commissioner of Agriculture.

WEST INDIAN COTTON.

The following is a short summary of an address delivered at Barbados by Mr. E. Lomas Oliver, one of the Deputation from the British Cotton-growing Association :—

It is always an advantage for the producer and consumer to keep in close touch with one another. You are cotton growers : I am a cotton spinner. If I can do no good, it can at any rate do no harm for us to explain to one another the difficulties we have to contend with in our relative industries. I intend to be perfectly candid with you and to tell you the faults as well as the merits of the cotton you have so far sent us.

One of the characteristics of the West Indian cotton shipped during the last two years has been the large proportion of fibres which contain little or no natural twist, the cotton not being round with a spiral twist but flat like a tape. This natural twist is very desirable because, if it is not in the fibres naturally, the spinner is obliged to put in extra twist to hold the fibres together. The more twist a spinner has to put in, the more his cost of production is increased. Even when the extra twist is put on, the yarn is not so good, because the twist being artificial and not natural, the yarn is rendered more brittle and less elastic and snaps more easily under any strain. At the close of my remarks, I shall show you samples of these fine yarns and I think you will then understand the great advantage of the presence of natural twist. I understand from Sir Daniel Morris that one of the chief causes of this absence of natural twist in West Indian cotton was the presence of immature fibre caused indirectly by the attacks of the cotton worm, and by picking the cotton before it was properly ripe. More care will therefore have to be taken by the pickers, if you are to send us perfect cotton.

Another important point is most carefully to avoid mixing the seed of long-staple and short-staple cotton, and, if through any cause whatever after carefully selecting your seed-cotton, that grown on one patch should be inferior to that grown on another patch, then keep them separate, for, if you mix them, you will only obtain a price equal to the worst cotton in each bag, and, even then, a spinner will avoid buying mixed cotton, if there is a plentiful supply of perfect cotton on the market. Just as the strength of a chain is its weakest link, so is cotton only worth the value of the poorest cotton in the bag. If necessary, divide your crop into three grades, and, if you do this, you will be able to obtain the full market prices for each grade. Remember you are aiming at supplying a trade in which *quality* is all important.

Those planters who intend producing a really good quality of cotton should put their names, or the name of their estate, upon the bags containing their first grade of cotton, and some other distinguishing mark on their second grade. In our trade, if a cotton of a certain mark has been found to yield satisfactory results, the spinner will look out with interest for the same mark of cotton again, and in two or three years that planter, if he keeps up a regular standard quality, will have established a reputation which will prove a very valuable trade asset.

A third point, which it is very desirable you should observe, is to use a good covering for the bags and to press them to about 200 cubic feet to the ton weight, and to let the bags be between 300 and 400 lb. weight each. Of course, if you have 100 or 200 lb. over, you will have to send a smaller bag to finish off the crop of that grade; but do not be tempted to make up a bag of full weight by mixing two grades, for it is almost certain the spinner will find you out and your reputation as a grower will in consequence suffer. It will be well for you *not* to ship smaller lots than 5 or 6 bags of one grade at a time. Odd bags are not easily saleable and less than 100 lb. is not a merchantable quantity. The British Cotton-growing Association will, however, buy odd bags of ginned cotton which are not stained, but which are clean, at 8*d.* per lb. Stained cotton should *not* be shipped unless the owner is prepared to see it sold for 5*d.* per lb. when it reaches England.

It would also be as well for a standard weight and size of canvas to be adopted for the whole of the West Indies, and be sure to choose a fairly good quality so that when the cotton arrives at the mill in England there is no cotton protruding through holes in the bag. This may not be as important as the first points I have touched upon, but you will be well advised if you bale your cotton so that it will arrive in the best possible condition. Some of your cotton is sent out in bales bound round with iron bands like Florida and Georgia Sea Island cotton, but I understand in some cases presses have been obtained for making up the cotton in bags without bands, which will give the bales the same appearance as the cotton from Edisto and James Island. The very finest and highest-priced cotton never has iron bands round the bales. I do not think a single planter in Edisto or James Island puts bands round his cotton, and to see bales with iron bands round them might lead some spinners to be suspicious lest they were buying Florida and Georgia Sea Island and not real Sea Island grown upon islands.

You have had a considerable advantage over every other British cotton-growing area in that you have had the benefit of Sir Daniel Morris' presence and his unrivalled agricultural knowledge. Most of us have to buy our experience very dearly and learn by the mistakes we make how not to do it. The progress which you have so far made in cotton growing is simply phenomenal; and if your industry has made such strides, you have Sir Daniel Morris and his staff to thank for obtaining such an accumulation of knowledge of detail as you could not perhaps otherwise have gained in less than a generation of failures and mistakes. It is a great pleasure to me, I can assure you, to come here and second the efforts of so devoted a public official, and, if my experience as a spinner of cotton is of any use to you, I shall be only too happy to explain what the requirements of a spinner as regards his raw material are. Remember that the class of cotton you are growing does not go into coarse goods where defects are not readily detected. It is used, amongst other things, in the manufacture of Brussels and other lace, embroidery, curtains, muslins, gloves, and the best sewing cotton. If you will follow the advise of Sir Daniel Morris and the members of his staff on matters on which you are not quite sure, you will be well advised. The great regret often expressed at the British Cotton-growing Association meetings is that they are unable to find five or six other agricultural authorities with the same energy as Sir Daniel, because they see that the state of progress arrived at in the West Indies surpasses by far the progress made in other places where we are trying to grow cotton. The cotton you have already sent possesses some most important and satisfactory features. It is not yet quite so good as the cotton we get from Edisto and James Island, but, with the hints which have been given you from time to time, there is no reason why, if you follow them, you should fear, in the case of very fine cotton, the competition of the whole world, and you will be able to take that place to which your soil and your climate entitle you in this important industry.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of agents will be found at foot of page 367 of this issue.

The *Agricultural News:* Price 1*d.* per number, post free 1½*d.* Annual subscription payable to Agents 2*s.* 2*d.* Post free, 3*s.* 3*d.*

Agricultural News

Vol. III. SATURDAY, NOVEMBER 5, 1904. No. 67.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue deals with the proposed arrangements for holding the next Agricultural Conference at Trinidad.

In connexion with the sugar industry a note on the Naudet process of sugar extraction and a summary of results of manurial experiments at Barbados are published on pp. 354-5.

Further reports on the prospects of the cotton crop in the West Indies are likely to be of interest. Other notes relating to the cotton industry contain important information with regard to the production of long-staple cotton. (p. 357.)

Extracts from the address delivered at Barbados by Mr. E. Lomas Oliver, of the Deputation from the British Cotton-growing Association, contain hints of importance to West Indian cotton growers. (p. 359.)

Under the heading 'Insect Notes' will be found a brief account of the usefulness of the toad as a destroyer of insects. (p. 362.)

Two extracts relating to agricultural education indicate that satisfactory progress is being made in this connexion at Tobago and St. Vincent. (p. 363.)

The report by Mr. J. R. Jackson on West Indian products in the London market for the month of September is published on p. 365.

Sugar-cane Experiments at Barbados.

The summary of the results obtained in the manurial experiments with the sugar-cane, carried on at Barbados during the past year, which is published on pp. 354-5, shows that, on the whole, previous conclusions are confirmed. Nitrogenous manures were found to be the most important, and their application was nearly always profitable. Phosphatic manures led to profits in some cases and to losses in others. In most cases a profit accrued from the use of potash as sulphate of potash.

Exports of Grenada.

The following summary of the principal items of export from the island of Grenada during the year 1903 may be of interest:—

Cacao, 58,490 bags, valued at £229,463 6*s.* 2*d.*; nutmegs and spices, 7,959 cwt., of the value of £31,583 1*s.* 8*d.*; raw cotton, 2,687 cwt., valued at £4,205; cotton seed, 6,757 cwt., of the value of £1,140 5*s.* 8*d.*

Comparison with the exports for 1902 shows a falling off in the output of cacao, the crop in 1902 being 61,258 bags. In the case of nutmegs and spices, there was an increase of more than 1,000 cwt. over the export in the previous year, which was 6,839 cwt. As regards cotton, in 1902 the exports were 2,212 cwt. of raw cotton and 4,536 cwt. of cotton seed.

In regard to 'Agricultural Improvements' it is stated: 'The application of manure to cacao cultivation is on the increase throughout the island, and the drying of that product by artificial means, instead of relying upon sunlight, is being gradually adopted.'

West Indian Cotton.

In his address to the members of the Barbados Agricultural Society on West Indian cotton (see p. 359) Mr. Oliver dealt with some of the faults of cotton that has been sent from these islands. It is hoped that cotton growers will give careful consideration to the points raised in this address.

One of the most serious faults has been the absence of the spiral twist on the fibre so much desired by fine spinners. This is due to much of the cotton having been picked before it was thoroughly ripe. The absence of this twist materially increases the cost of production to the spinner. Next, care must be taken to avoid the mixing of long-staple and short-staple cotton. The cotton must be carefully graded, for the spinner does not want mixed cotton; moreover, for mixed cotton the shipper will obtain only the price of the worst cotton in the lot. Mr. Oliver advises growers to brand the packages with the name of their estate and to have a distinguishing mark for each grade. In this manner growers of really good-quality cotton will be able to establish a reputation for their product.

Finally, Mr. Oliver advised shippers to adopt a standard weight and size of canvas for the whole of the West Indies, and to avoid the use of iron bands which are not used for the very best grades of Sea Island cotton but only for Florida and Georgia cottons.

British Cotton-growing Association Deputation.

Messrs. E. Lomas Oliver and Richard Stancliffe, forming a Deputation from the British Cotton-growing Association, arrived at Barbados on October 24. During their stay in Barbados they have visited a number of estates on which cotton is being grown, and on October 28 were present at a meeting of the Barbados Agricultural Society. At this meeting Mr. Oliver delivered an address, a summary of which is published on p. 359.

On November 1 the Deputation left Barbados, in company with Sir Daniel Morris, on a tour of the Northern Islands, visiting St. Lucia, Dominica, Montserrat, Antigua, and St. Kitt's. Later, a visit will be paid to St. Vincent (November 12), and if steamer movements permit, probably Grenada and Tobago will also be visited. Messrs. Oliver and Stancliffe will leave Trinidad for Jamaica on November 22.

Mr. Oliver is possessed of wide experience in regard to cotton matters. He is a Director of the Fine Spinners' Cotton Association, and from the first has taken a deep interest in the West Indian cotton industry. He is desirous of obtaining samples of cotton (5 lb. to 50 lb. each) produced from the early plantings this year, in order that he may have an opportunity of expressing an opinion upon them for the information of growers, and of pointing out their merits or defects, as the case may be.

Exports and Rainfall.

During last year there was a considerable decline in the export trade of Lagos—a decline which is due entirely to unfavourable meteorological conditions. In dealing with this matter in his *Annual Report* on the colony for 1903, the Governor states that variations in exports are purely a matter of rainfall. This is particularly the case with the products of the palm oil tree (*Elaeis guineensis*) which form over 50 per cent. (in value) of the colony's exports.

By means of figures dealing with the last fifteen years, the unmistakable correlation between rainfall and the exports of palm produce is demonstrated. Thus, in 1901 the rainfall amounted to 112·59 inches (the unprecedented fall of 31 inches being recorded for September and October); the effects of this are seen in the record crop of 5,240,137 gallons of palm oil and 75,416 tons of palm kernels in the following year. On the other hand, the exports in the following year were 3,174,060 gallons of oil and 63,568 tons of kernels: this decline might have been predicted by an intelligent observer from the fact that the rainfall for the previous year (1902) had been only 47·82 inches. The figures show that the exports of palm oil are even more sensitive than those of kernels.

Normally, the oil palm flowers every five or six weeks and bears eight or nine mature bunches of fruit in the year; if, however, the rainfall is scanty, the tree flowers only every ninth or tenth week, and the number of fruit bunches is reduced to about five. Insufficient rainfall also has the effect of reducing the proportion of oil in the fruits.

Lemon Grass Oil from Montserrat.

The *Bulletin of the Imperial Institute* (Vol. II, no. 3) contains a report on a sample of lemon grass oil from Montserrat forwarded by the Hon. F. Watts. An herbarium specimen forwarded subsequently was identified by the Director of the Royal Gardens, Kew, as *Andropogon nardus*, L., var. *genuinus*, Hack., which is commonly known as the true lemon grass.

Results are given of analyses obtained with the Montserrat oil both at the Imperial Institute and at the Government Laboratory for the Leeward Islands, as well as corresponding figures for commercial lemon grass oil distilled in India from *Andropogon citratus*. Lemon grass oil is now principally employed as a source of citral, and the amount of this constituent practically regulates the commercial value of the oil. It is therefore interesting to learn that the Montserrat oil contains as large a proportion of this valuable constituent as the East Indian oil. The Montserrat oil, however, differs from the latter in being incompletely soluble in 70 per cent. alcohol. It was found that this fact caused the dealers to whom specimens were sent to quote a low price (4½*d.* per oz.). It was considered, however, that 5*d.* to 6*d.* per oz.—the present price of good-quality East Indian oil—might be obtained, if regular shipments were made in fair quantities.

'These results indicate that Montserrat lemon grass oil, in spite of its peculiar partial insolubility in alcohol, would probably find a ready sale at remunerative prices in this country and on the Continent.'

Sunflowers as a Crop.

The *Agricultural World* of October 1 has an interesting article on the culture, uses, and value of sunflowers as a crop. In Western Europe and America the sunflower is chiefly grown for ornamental purposes and has hardly, except in recent years, risen to the dignity of a crop. In Russia, however, sunflower seeds have come into general use as a staple article of human food and for the production of oil which closely resembles olive oil. The 'oil cake' left after the oil has been extracted is rich in protein and oil and well relished by stock, being equal, if not superior, to linseed cake for feeding purposes.

Sunflower seeds contain from four to five times as much fat as corn and more protein than any of the cereal grains, comparing well in proteid content with peas and beans. Hitherto they have been used chiefly as a poultry food.

To obtain the largest crops fertile land rich in humus is necessary. In producing the large amount of protein contained in the seed, the crop exhausts the soil of its nitrogen. The seed is planted in rows 3 to 3½ feet apart, and 3 to 4 inches apart in the rows. Later, the plants should be thinned to 12 to 18 inches apart in the row; in other respects the crop should be cultivated in the same manner as corn.

The heads should be harvested before the seeds are fully ripe, and then cured for a week or so before shelling. As a rule, the seeds are shelled by hand, but doubtless cheaper and more rapid methods could be devised.

INSECT NOTES.

Ticks.

The following note on ticks is taken from the *Cyprus Journal*:—

Many owners of dogs as well as other animals are doubtless troubled at finding how constantly their four-footed friends become covered with ticks. With a view to checking the multiplication of these objectionable insects, the following points may be worth noting.

The tick does not travel, nor will it reproduce until it has sucked blood. The female is usually found in the folds of an animal's ears, neck, or other concealed part, gorged with blood, and with the male, a smaller parasite, close to it. As soon as the fertilized female falls from her prey, she produces her young, commonly known as grass lice. When she drops them they climb up a grass or other stalk, and cluster at the top like bees, where they lie in wait to fall upon any passing living creature. Should none approach within reach, they simply die. It is, therefore, of importance that, when the ticks are removed from the animals, they should be immediately destroyed, so that they may be prevented from propagating their species.

In some parts of the world, notably in the West Indies, ticks have been at times a great scourge, and elaborate means have had to be taken to pen the animals, and after removing the ticks, collect them into some vessel and then destroy them by fire.

Care in promptly killing the ticks at once after removal will do much to check their increase.

The daily brushing and examining of dogs is a useful and effective precaution.

Toads.

Throughout the West Indies, and extending south to Brazil and Argentine and north to Bermuda, the toad or crapaud is quite common. It is known as the great Surinam toad and Agua toad, and its scientific name is *Bufo agua*. It is considered the largest existing toad, and is supposed to have been introduced from the mainland of South America to the West Indies. It is of interest to agriculturists on account of the nature of its diet, which consists chiefly of insects. Professor A. E. Verrill in his book, *The Bermuda Islands*, says: 'In Barbados and Jamaica it is valued because of its habit of catching field rats and insects.' Cockroaches, and ground beetles have been commonly found in the stomachs of toads, and it is well known that the common hard-back, the larva of which is the root-borer of canes, is eaten by them. They breed in stagnant water, each female laying a large number of eggs.

The only objectionable quality attributed to this animal is the 'venom' secreted by the parotid and dorsal glands. Dogs that bite or attack toads invariably become extremely ill and sometimes die in a very short time. According to Professor Verrill, the secretions of the glands, when injected into the circulation of dogs, birds, and other animals, cause convulsions and death even when in small doses. He also records that a member of his party in Bermuda on one occasion saw the venom ejected as a fine spray from the parotid glands of a large toad when it was much irritated. Persons, however, handle these toads without injury or noticeable effect from this secretion.

The American toad (*Bufo lentiginosus*) is similar in appearance to the crapaud but smaller. In an excellent paper, entitled 'Usefulness of the American Toad,' published as *Farmers' Bulletin* No. 149 of the United States Department of Agriculture, Mr. A. H. Kirkland discusses the habits and food of this interesting animal. In 149 stomachs he found that 62 per cent. of the food consisted of injurious species exclusive of ants, and if these were counted as injurious, the total of injurious species amounted to 81 per cent. This total includes, beetles (hard-backs), caterpillars and cutworms, wireworms, millipeds, sow bugs (wood lice), and grasshoppers.

Poisonous secretions are found in this species also, but Mr. Kirkland mentions them as secretions of the skin, and they are less violent in their effect.

Toads are voracious feeders and from the nature of their food are of benefit in an agricultural community. They live in holes under stones or other protection, and it is a common thing to find several in an old cane trash heap. They could probably be easily established in any locality if they were introduced and provided with shelter, and might be efficient in cases of infestation by mole crickets ('Cochon terre') or other insect of similar habits.

The toad, however, is different from the crapaud or 'mountain chicken' of some of these islands. The mountain chicken is a frog, and though it, too, feeds on insects, its habit of living in the mountains and forests probably makes it less useful from an agricultural point of view.

MANGROVE BARK INDUSTRY.

The exports of mangrove bark from the island of Pemba amounted in 1903 to 95 tons, valued at £380. The *Consular Report* on the Trade of Zanzibar and Pemba has the following note on this industry:—

The item mangrove bark, which appears for the first time in 1903 amongst the customs returns, is a product of high value for tanning purposes. It grows in great abundance in the numerous tidal creeks throughout the island, and it appears to be of excellent quality from a commercial point of view. I believe that the Pemba bark would fetch £5 or £6 per ton in the European markets. The Zanzibar Government has lately prohibited the collecting of mangrove bark in Pemba, save under licence. I understand that up to the present one firm only, a French firm in Zanzibar, has applied for and obtained such licence.

According to the British Honduras *Clarion*, mangrove bark is fast becoming an important article of export from that colony. The demand is said to be practically unlimited. In the West Indian Colonies there is an almost inexhaustible supply.

Nut-Cracking Machine. Experiments were tried during the year with a patent machine for cracking palm nuts, as large quantities of the kernels are wasted by the natives in the primitive methods adopted; but though the reduction in the cost of labour in passing 2,050 lb. through the machine worked out at 41 per cent., it was found that 19 per cent. of the nuts remained unbroken, and a more effective machine is required. (*Annual Report* on Gold Coast for 1903.)

EDUCATIONAL.

School Gardens at Tobago.

Mr. H. Millen, Curator of the Botanic Station at Tobago, has forwarded the following note on school gardens in the island :—

Most schools have attached to them a plot of land devoted to the growing of tropical and temperate economic plants. There exist twenty-three gardens in the island.

Recently these have been inspected by the Curator and Agricultural Instructor, and some of the gardens are very creditable ; the gardens are worked entirely by the boys attending the schools. It was noticeable that the gardens in Country Districts are generally kept in a better condition and more interest is taken in them than those in or near a town. At the next School Garden Show to be held in November some good exhibits are expected ; the Botanic Station has assisted in distributing seeds and plants ; but to secure a regular supply of European vegetables seeds should be imported at intervals.

Agricultural Education at St. Vincent.

The following extracts relating to the teaching of Agriculture are taken from the report of the Inspector of Schools for the Windward Islands on the examination of the elementary schools of the colony of St. Vincent held between May 20 and July 27, 1904 :—

This was the first occasion on which this subject also formed part of the school curriculum. With the exception of the examination at Chateaubelair Wesleyan School, the whole lot of examinations was conducted on purely theoretical lines. School gardens have been laid out at the following schools :—Chateaubelair, Troumaca, Buccament, Chauncey, Camden Park, and Brighton, but only those at Chateaubelair, Chauncey, and Camden Park have been cultivated, the others probably having been allowed to await the incoming of the rainy season. The pupils of Kingstown Anglican, Roman Catholic, and Wesleyan Schools which have no plots attached to them, pursued their studies during the year at the Agricultural School in Kingstown on certain regular days appointed for the purpose. There are, in addition to these school gardens, plots under Government control available for primary school work at Belair and at Georgetown, adjoining the schools there ; while at Stubbs and Marriaqua, there is ample frontage for making good gardens.

The teaching has been confined as a rule to a very elementary course of study : but Chateaubelair, Kingstown Anglican, and Brighton did rather more advanced work than the others. The first mentioned was by far the best in the colony. The pupils gave practical demonstration of their knowledge of the theory taught them, by the ease and familiarity with which they dissected and removed the several parts of bean seeds, showed and handled separately the different parts of the hibiscus flower, unpotted plants and understood their re-potting, and answered questions particularly relating to soils and drainage, together with various other tests undergone by them. Their garden was in excellent order notwithstanding the fact that the dry season had scarcely then passed. On the whole, first principles were well and carefully taught in all schools offering this subject. Blackie's *Tropical Readers* have been supplied in all the schools and are made use of by the pupils, the teachers supplementing the information therein given, when found necessary, from the notes taken at the lectures attended by them. There was hardly any cultivation of plants in pots or tubs. Those schools which possess no garden might advantageously make an effort in that direction, especially as the Imperial Department of Agriculture awarded Diplomas of Merit to several schools for the excellence of their exhibits in pots and tubs at the Agricultural Show held in the month of March of this year.

From the very satisfactory results obtained at the Chateaubelair Wesleyan School, I strongly recommend and advise teachers to teach 'object-lessons' as frequently as opportunity will permit, *from plant life and agricultural subjects.* The subject should be taught in the lower standards with the view, among others, to becoming the handmaid eventually, *by means of lessons on plant life, etc.,* of the more advanced study of agriculture. As taught at present, this latter is not unfrequently looked upon by junior men as being merely an overgrown parasitic off-shoot of the former and nothing more. Managers, by co-operation with such teachers, can readily disabuse their minds of this fallacy and, as time goes on, the harmonious relationship of the two subjects will naturally be brought into full play, almost unconsciously, with all the advantages derivable therefrom.

YLANG-YLANG OIL.

The *Board of Trade Journal* for September 8 has the following extract from the 'Monthly Summary' of commerce of the Philippine Islands :—

Among the other products of economic value in the Philippines, ylang-ylang oil as an export amounted to $123,182, or about 50 per cent. increase over the trade in 1902, the shipments to France advancing in about the same proportion. Some consider the oil as equal in perfume to attar of roses, and by the greater yield of essence furnishing a less expensive base, it becomes a strong competitor of the latter, the perfumers of the United States to whom exporting houses in Manila shipped nearly $10,000 worth last year, making it the base of some of their most expensive extracts. The ylang-ylang tree grows best in the Philippines and it takes about 75 lb. of the flowers, worth from 8c. to 15c. gold per lb. to yield 1 lb. of oil. The cost of manufacture is about $4, and it sells readily for from $40 to $50 in open market, with the supply unequal to the demand.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned to Barbados on Monday, October 24, and resumed the duties of his office the same day.

The Imperial Commissioner of Agriculture, accompanied by Messrs. E. Lomas Oliver and Richard Stancliffe, the Deputation from the British Cotton-growing Association, left Barbados on S.S. 'Dahome' on November 1, for the Northern Islands. It is expected that Sir Daniel Morris will return to Barbados in S.S. 'Orinoco' on November 11. He will leave soon afterwards with the members of the Deputation for the Southern Islands.

Consequent on the departure from St. Vincent of Mr. C. H. Knowles, B.Sc., and pending the arrival of his successor, Mr. A. J. Clarke, of Barbados, has been temporarily appointed to carry on the duties of Resident Master at the Agricultural School.

GLEANINGS.

An Order-in-Council, dated August 13, 1904, provides for the free importation into St. Lucia of 'insecticide ingredients and apparatus for the application thereof.'

Arbor day will be celebrated at Nevis on the Kings' birthday, November 9. Everything is being done to bring it to a successful issue.

Regulations and prize lists of an Agricultural Show to be held in Trinidad from February 13 to February 18, 1905, have been issued as an Agricultural Society paper (no. 215).

The principal exports from Trinidad during 1903-4 were :—Crude asphalt, 1902-3, £145,712; 1903-4, £178,984; cacao, 1902-3, £907,531; 1903-4, £897,033; sugar, 1902-3, £410,000; 1903-4, £435,931. (*Board of Trade Journal.*)

The *Gardeners' Chronicle*, referring to the increasing demand for bananas, states that during the past eight months 2,492,702 bunches were imported as against 2,041,835 in the same period last year, and some 1,650,992 bunches for the same period of 1902.

The exports of cotton from Peru in 1903 amounted to 7,530 tons, an increase of 1,050 on the previous year's exports. Cotton seed, to the extent of 5,264 tons was also exported, as well as 2,212 tons of cotton seed oil cakes. (*Consular Report.*)

We congratulate the Rev. N. B. Watson, B.A., of St. Martin's Vicarage, Barbados, on being elected a Fellow of the Entomological Society of London. Mr. Watson contributed a valuable paper on 'The Root Borer of Sugar-cane' to the *West Indian Bulletin* (Vol. IV, pp. 37-47).

It has been decided by the Exhibition Committee of the Jamaica Agricultural Society that a representative exhibit shall be sent from the colony to the Colonial and Indian Exhibition to be held at the Crystal Palace in 1905. The exhibit will include specimens of economic plants and products, and a special representation is likely to be made of honey and preserves.

With reference to the paragraph in the *Agricultural News* (Vol. III, p. 348) in which it was stated that at Grenada Mr. L. R. Mitchell was prepared to gin and bale cotton at $\frac{3}{4}d.$ per lb., it is desirable to mention that this is for Upland cotton for which a saw gin can be used. Sea Island cotton, which fetches about three times as much, requires a roller gin, and the ginning is naturally more costly.

Messrs. Pickford & Black have written to the Imperial Commissioner of Agriculture regretfully informing him that the West Indian exhibits left over from previous Canadian Exhibitions were totally destroyed by the fire at their premises on September 19 last.

With reference to cotton planting in Trinidad, Mr. J. H. Hart writes as follows: 'We have no means of correctly ascertaining what the area under cotton is. One planter is under orders to plant 50 acres, and in small lots probably some 100 acres will be grown, including the four experiment plots supported by the Government.'

During the fortnight ended October 6, 46 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West Indian, 4·00*d.* to 6·75*d.*; West Indian Sea Island, medium fine, 13*d.*; fine, 14*d.*; extra fine, 16*d.* per lb. (*West India Committee Circular.*)

Dr. Watts writes from Antigua: 'Will you please draw attention to an omission, due to an imperfect copy being supplied to you, in the list of cotton experiments published in the *Agricultural News* (Vol. III, p. 237). Plot 16 should receive 30 lb. of nitrogen in addition to the phosphate and potash.'

Among the articles, the free importation of which into Montserrat is allowed by an Ordinance which came into force in July 4 last, may be mentioned: chemicals for agricultural purposes, insecticides and fungicides, multiple-effect machinery for manufacturing sugar, and other machinery to be used for the preparation of agricultural produce.

The exports of cotton from Alexandria amounted in value, in 1903, to £15,873,514, the quantity being 545,832,342 lb., about one-half of which went to the United Kingdom. This value represents an increase of over £1,700,000 on the exports of the previous year. (*Consular Report.*)

Raw rubber was by far the most important article of import into Belgium from the Congo Free State in 1903 and showed an increased volume of 321 tons, and an increased value of £313,640. The total value of the rubber, which amounted in volume to 5,917 tons, was £1,656,800. (*Consular Report* on trade of Belgium.)

According to the *Consular Report* on the trade of Madeira, the whole of the onion crop (1,161 tons in 1903) was exported to the West Indies and Demerara. The West Indies also received a share of the potato exports. In exchange Madeira imported from the West Indies and Demerara molasses and sugar.

Many of the pictures which have appeared in the *West India Committee Circular* are being reproduced as picture post-cards, and will shortly be published by the well-known firm of Raphael Tuck & Sons.

With the object of popularizing the West Indies a series of the photographs taken by the Secretary of the West India Committee will shortly be published under the title 'Sun Pictures of the Antilles and British Guiana.' Full particulars can be obtained from Messrs. H. & W. Grant, 18-19, Whitefriars Street, E.C.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on West Indian products, more especially drugs and spices, in the London market, has been furnished by Mr. J. R. Jackson, A.L.S.:—

BANANA TRADE.

Though drugs and spices, generally, continue to have but a normal existence in the London sale rooms, other West Indian products have been well to the fore during the month of September, particularly the banana, which has of late taken a firm and increasing hold on the popular taste. The daily press has drawn particular attention to the value of the banana, not only as a delicious fruit, but also to its importance as a food, and has further pointed out that at the rate of three and, sometimes, even four a penny, at which prices they have been sold in London and some of the large provincial towns, no cheaper or more wholesome fruit can be obtained, and this in a season when English home-grown fruits of nearly all kinds are most plentiful. It is satisfactory to note that Jamaica stands prominently forward as the principal colonial source of supply and that the new steamer 'Port Kingston'—the latest addition to the Direct Line between Bristol and Jamaica—arrived on September 28, making the voyage in ten days, and bringing 24,000 bunches of bananas, besides oranges and other fruits, and further, that samples of Jamaica cotton had been brought by the same vessel, for the purpose of submitting them to experts of the British Cotton-growing Association. Though fruit and cotton have only an indirect bearing on the subject of drugs, allusion is here made to them as showing that the interest in all West Indian products is being keenly maintained in the mother country.

GINGER.

Reverting to the spice and drug markets, and taking ginger for our first consideration, the month did not open very bright; only small sales were effected in all the kinds, Jamaica fetching 40*s.* for bold and 35*s.* for middling, while for bold cut Cochin, 60*s.* was asked, and small medium, 40*s.* A week later 191 barrels of Jamaica were offered for which there was no demand, and inferior qualities of Cochin sold at low prices. A better tone prevailed at the spice sales on the 21st., when about 200 bags of Jamaica were offered and sold chiefly at 37*s.* 6*d.* for middling washed, 30*s.* 6*d.* to 32*s.* 6*d.* for ordinary to good ordinary, and 26*s.* to 29*s.* for ordinary small to dark lean. A moderate supply of Cochin and Calicut was also offered at this auction, fair washed rough Cochin being sold at 18*s.*, wormy ditto at 16*s.*; brown Calicut, wormy, realized 14*s.* 6*d.* and small, rough wormy 14*s.* to 14*s.* 6*d.* Bold, bright Calicut, slightly wormy, fetched 26*s.*, as did also bold bright rough. At the last sale of the month, on the 28th., the market was dull and prices remained about the same.

As bearing on the supply of ginger generally, it may be interesting to quote from a paragraph that has appeared on the exports of ginger from Sierra Leone during the year 1903, which amounted to 17,567 cwt., realizing £15,898 as against 15,512 cwt., of the value of £17,358 in the previous year. It is thus evident that, although there was a larger export than in 1902, there was a decrease in value, due mainly to the fall in the market price which was as low as 1½*d.* per lb.

SARSAPARILLA.

At the drug sale on September 1, sarsaparilla stood thus:—A bale of fair red native Jamaica realized 9½*d.*, and another bale, less bright, 8½*d.* No grey Jamaica was offered, but 1*s.* 2*d.* was mentioned as about its value. On the 15th. there was again an absence of grey Jamaica and there was no demand for native, of which 11 bales were offered and bought in. Seven bales of rather coarse, sound, Lima-Jamaica were disposed of at from 10*d.* to 11½*d.*, and 6 bales of Tampico, without chumps, were held at 1*s.* per lb. At the last sale, on the 29th., genuine grey Jamaica was reported as still scarce, only 10 bales being offered; 1*s.* 2*d.* was refused for fair, the buying-in price being 1*s.* 6*d.* Two bales of sea-damaged realized 1*s.* 1*d.*, while of native Jamaica, 5 bales were sold at 7½*d.* to 8*d.* for medium dull yellowish.

KOLA NUTS.

On September 1, 57 packages were offered and 21 sold mostly at steady prices. Of these, 13 packages of fair to good bold bright West Indian halves were disposed of at from 4¾*d.* to 5*d.* per lb., 4¾*d.* being also paid for 4 cases of good bold Ceylon. Twenty-eight packages of African were offered and bought in at 4*d.* per lb. On the 15th., the markets had but very slightly changed, good bold bright Jamaica fetching 4*d.* to 4¼*d.*, ordinary mouldy West Indian 3¾*d.*, and mouldy fresh 1*d.* per lb. These prices varied but little at the end of the month. From Hamburgh a report comes that there has been a brisk demand during the month, and no important supplies have entered the market, in consequence of which prices are tending higher. A Sierra Leone report on the trade in kola nuts during the year 1903 states, that the exports in that year were 15,176 cwt., of the value of £76,355 as compared with 14,707 cwt., of the value of £60,517 in 1902. The export is chiefly to the Gambia and the French West African Colonies of Senegal, namely, Rufisque, Dakar, and Goree, whence it is carried to the interior where there is an insatiable demand for it. The supply is obtained largely from the Protectorate whither a large number of traders from the colony resort during the last quarter of the year, which is regarded as the kola season, and make purchases partly by cash payments and partly by a system of barter.

ARROWROOT.

The market in this article has been quiet throughout the month. At the spice sale on the 7th., 135 packages of St. Vincent were bought in at 2*d.* to 3*d.* per lb.; and on the 21st., 250 bags were offered, of which 100 of good manufacturing were sold at 1¾*d.* per lb., which had slightly declined at the sale on the 29th.

LIME JUICE, NUTMEGS, MACE, AND PIMENTO.

Lime juice at the beginning of the month was reported as both plentiful and cheap, good raw West Indian being offered at 1*s.* to 1*s.* 1*d.* per gallon, while fair West Indian distilled oil of lime sold at 1*s.* 5*d.* per lb. at the close of the month.

Of nutmegs, in the early part of the month, West Indian were realizing rather higher rates than had ruled in August.

Mace was also steady, West Indian selling at 1*s.* to 1*s.* 3*d.* for red; 1*s.* 4*d.* to 1*s.* 5*d.* for ordinary to fair; 1*s.* 7*d.* to 1*s.* 8*d.* for pale; and 1*s.* 1*d.* to 1*s.* 2*d.* for pickings.

On the 7th., 238 bags of pimento were offered, 34 being sold without reserve at 2⅝*d.* for greyish, this price being maintained at the closing sale of the month, when 247 bags were offered and 120 found purchasers.

MARKET REPORTS.

London,—October 11, 1904. Messrs. J. Hales Caird & Co., Messrs. Kearton, Piper & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' October 7; and 'The Public Ledger,' October 8, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
Arrowroot—St. Vincent, 1½*d.* to 3½*d.* per ℔.
Balata—Block, 1/3 to 1/3½ per ℔.
Bees'-wax—£7 5*s.* per cwt.
Cacao—Trinidad, 56/- to 67/- per cwt.; Grenada, 51/- to 57/- per cwt.; Dominica, and Jamaica, 49/- to 56/- per cwt.
Cardamoms—Mysore, 7½*d.* to 2/- per ℔.
Coffee—Jamaica, good ordinary, 38/- per cwt.
Cotton—West Indian Sea Island, medium fine, 13*d.*; fine, 14*d.*; extra fine, 16*d.* per ℔.
Fruit—
Bananas—Jamaica, 5/3 to 7/- per bunch.
Grape Fruit—7/- to 9/- per box of 150-200.
Oranges—Jamaica, 6/- to 8/- per case.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Fair bright, 37/6; common to middling, 29/- to 37/6 per cwt.
Honey—Jamaica, 15/- to 28/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/10; cake, 1/2 per ℔.
Kola Nuts—3*d.* to 4½*d.* per ℔.
Lime Juice—Raw, 10*d.* to 1/2 per gallon; concentrated, £14 per cask of 108 gallons.
Lime Oil—Distilled, 1/5½ per ℔.; hand-pressed, 2/6 to 2/9 per ℔.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Good bold pale, 1/6 to 1/11; red, 1/2 to 1/5; broken, 10*d.* to 1/2 per ℔.
Nitrate of Soda—Agricultural, £10 7*s.* 6*d.* per ton.
Nutmegs—59's, 2/7; 88's, 1/1; 146's, 6½*d.*; shell, 4½*d.* to 4¾*d.* per ℔.
Pimento—2⅝*d.* per ℔.
Rum—Demerara, 7*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
Sarsaparilla—9*d.* to 1/6 per ℔.
Sugar—Crystallized, 18/3 to 19/3 per cwt.; Muscovado, Barbados, 14/- to 14/6 per cwt.; Molasses, 12/6 to 16/- per cwt.
Sulphate of Ammonia—£12 per ton.

Montreal,—October 9, 1904.—Mr. J. Russell Murray. (In bond quotations, c. & f.)

Bananas—Jamaica, 50c. to 75c. per bunch of 8 hands; $1·00 to $1·05 per bunch 'firsts'; $1·30 to $1·40 per bunch 'jumbos.'
Cedar—Trinidad, 40c. per cubic foot.
Cocoa-nuts—Jamaica, $27·00 to $29·00; Trinidad, $20·00 to $25·00 per M.
Coffee—Jamaica, medium, 9c. to 10c. per ℔.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per ℔.
Limes—Jamaica—No quotations.
Molascuit—Demerara, $1·32 per 100 ℔.
Molasses—Barbados, 25c. to 27c.; Antigua, 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 19c. to 19½c. per ℔.
Oranges—Jamaica, $4·00 per barrel, $2·00 per box; Dominica, $2·20 per box.
Pimento—Jamaica, 5¾c. to 6¼c. per ℔.
Pine-apples—Cubans, crates 36's to 10's, $3·00 to $4·10.
Sugar—Grey Crystals, 96°, $2·70 to $2·75 per 100 ℔.
—Muscovados, 89°, $2·50 to $2·65 per 100 ℔.
—Molasses, 89°, $2·25 to $2·35 per 100 ℔.
—Barbados, 89°, $2·45 to $2·50 per 100 ℔.

New York,—October 13, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¼c. to 13c.; Jamaica—No quotations; Grenada, 12c. to 12¼c.; Trinidad, 12c. to 13c. per ℔.
Cocoa-nuts—Trinidads, $33 to $34 per M., selected; Jamaicas, $34·00 to $35·00 per M.
Coffee—Jamaica, good ordinary, 8¾c. to 9c. per ℔.
Goat Skins—Jamaicas, 54c. per ℔.
Oranges—Jamaica, stem cut, $4·00 to $4·50 per barrel.
Pimento—4¾c. per ℔., spot quotation.
Sugar—Centrifugals, 96°, 4¼c.; Muscovados, 89°, 3¾c.; Molasses, 89°, 3⅛c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—October 22, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·50 to $3·60 per 100 ℔.
Cacao—Dominica, $12·00 to $12·50 per 100 ℔.
Cocoa-nuts—$13·50 per M. for husked nuts.
Coffee—$10·00 to $12·00 per 100 ℔.
Hay—95c. per 100 ℔.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
Onions—Madeira (stringed), $1·81 per 100 ℔.
Potatos, English—Nova Scotia, $1·60 to $2·15 per 160 ℔.
Rice—Ballam, $4·80 to $4·95 per bag (190 ℔.); Patna, $3·40 per 100 ℔.

British Guiana,—October 20, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 per barrel.
Balata—Venezuela block, 25c.; Demerara sheet, 35c. per ℔.
Cacao—Native, 12c. to 13c. per ℔.
Cassava Starch—$6·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 13½c. per ℔. (retail).
—Creole, 11c. per ℔.
Dhal—$4·20 to $4·25 per bag of 168 ℔.
Eddoes—80c. to $1·08 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—Madeira, $2·00 per 100 ℔.; Teneriffe, $1·75 per 100 ℔.
Pea Nuts—American, 7c. per ℔. (retail).
Plantains—16c. to 40c. per bunch.
Potatos, English—$4·00 per barrel.
Rice—Ballam, $4·40; Creole, $4·40 to $4·50 per 177 ℔., ex store.
Sweet Potatos—Barbados, $1·44 per bag, $1·80 per barrel.
Tannias—$1·68 per barrel.
Yams—White, $2·64 per bag.
Sugar—Dark Crystals, $2·41 to $2·48; Yellow, $2·90 to $3·00; White, $3·50 to $3·75; Molasses, $2·00 to $2·25 per 100 ℔.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75 and $5·50 per M.

Trinidad,—October 20, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary, $12·30; Estates, $12·60; Venezuelan, $12·30 to $12·40 per fanega (110 ℔.).
Cocoa-nuts—$19·00 per M., f.o.b.
Cocoa-nut Oil—77c. per Imperial gallon (casks included).
Coffee—Venezuelan, 7¾c. per ℔.
Copra—$3·00 to $3·10 per 100 ℔.
Onions—$1·50 to $1·70 per 100 ℔.
Potatos, English—$1·60 to $1·70 per 100 ℔.
Rice—Yellow, $4·20 to $4·40; White Table, $4·50 to $5·50 per bag.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 68. BARBADOS, NOVEMBER 19, 1904. PRICE 1*d*.

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Prospects of the Cotton Crop in the West Indies.

IN the last few issues of the *Agricultural News* a series of brief reports has been published giving information as to the prospects of the cotton crop in the different islands.

From these it will be learned that, taking a very moderate estimate, some 8,000 acres have been planted in cotton in these islands. It is probable that more complete information would enable this estimate to be placed at 10,000 acres. This acreage is, of course, exclusive of the Carriacou plantations, where some 4,000 acres have been planted, mostly with the Marie Galante cotton. According to the most recent information, the estimated areas under cotton in the different islands are as follows:—St. Kitt's-Nevis and Anguilla, 2,350 acres; Barbados, 1,600 acres; St. Vincent, 1,600 acres; Montserrat, 600 acres; Antigua, 500 acres; Grenada, 120 acres; St. Lucia, Trinidad, and Jamaica, about 100 acres each; Tobago, 50; Virgin Islands, 50; and Barbuda, 30 acres. The greater part of this area has been planted with the selected Sea Island seed obtained from South Carolina by the Imperial Department of Agriculture.

With good cultivation and the exercise of care in keeping pests in check, there is no reason why an average yield of at least 200 lb. of lint to the acre should not be obtained. It may therefore reasonably be expected that the total exports of long-staple cotton from the West Indies should be about 5,000 bales. The total value of this amount of cotton is likely to be about £100,000.

The general tenor of the reports sent in from the different islands is of a satisfactory nature and to the effect that crops are healthy and the land well cultivated. Last year, owing to the attacks of the cotton worm and other pests, the yield was, in many cases, poor. Planters were totally unprepared, and

frequently the supply of Paris green was insufficient to meet the sudden demand. Generally speaking, the repeated warnings of the Imperial Department of Agriculture in regard to this matter appear to have had the desired effect this year, and consequently, although the worm and other pests have made their appearance practically in all the islands where cotton is being grown, these attacks have, in most cases, been promptly met and the pests kept successfully in check. The cotton leaf-blister mite, which caused considerable damage in Montserrat last year, has appeared in most of the other islands, but it would seem that this pest can be satisfactorily dealt with by the application of sulphur and lime. The present is a somewhat anxious time for all concerned in the future of this industry, but there are encouraging signs that planters are thoroughly alive to the necessity of doing all in their power to obtain satisfactory results.

An impetus will, no doubt, be given to cotton growing by the visit of the Deputation from the British Cotton-growing Association. Mr. Oliver's addresses in the different islands have been well attended and have evoked considerable interest: his observations as to the requirements of the English market should make planters thoroughly realize the peculiar advantages they possess in being able to produce a high-class fibre for which there is a healthy demand for use in a special branch of the textile industry. His suggestions, too, in regard to matters that require attention should enable growers to obtain good prices for their product. Mr. Oliver's strongly expressed opinion as to the excellent quality of West Indian cotton is decidedly encouraging.

Mr. Oliver is of opinion that, when the cotton at present being grown in the West Indies comes to be marketed, it will be found that the lint grown from the 'Rivers' seed will command much higher prices, and be more readily sold, than that grown from seed from last year's crop. None of the latter cotton is likely, conditions of cultivation being equal, to obtain such good prices as the 'Rivers' cotton, and the best of the 'Rivers' cotton will probably sell for three times as much as some cottons now being reaped from mixed seed. The chief reason for this was that the cotton produced in the West Indies last year was, with very few exceptions, of a mixed character, long-staple and short-staple cotton being mixed in the same bag: consequently the seed from last year's crop is also likely to be of a mixed nature. Planters must realize that they cannot expect to get first-rate cotton from poor seed, any more than they would expect to get prize stock from mongrel animals.

SUGAR INDUSTRY.

Manufacture of Molascuit.

The *Sugar Planters' Journal* of October 22 contains the following translation of an article on the manufacture of molascuit which appeared in the *Journal d'Agriculture Tropicale.* Molascuit, it may be mentioned, is a mixture of molasses and bagasse containing about 80 per cent. of the former and 20 per cent. of the latter:—

The bagasse is put through a crusher (disintegrator) just as it comes from the mill; after being ground here, it passes into a separator which detaches from it the larger fibres of which the outer bark of the cane is composed, the intention being to retain only the residuum, or the interior of the cane stalks. Ordinarily, when it has left the separator, the material passes through a drier and from there into a hopper placed above the mixer. The hopper is so constructed that it can turn any desired amount of the material into the mixer; here it is ground and mixed with a certain proportion of molasses which is discharged by a reservoir, also placed above the mixer. When the mixing is finished, the material is put into sacks or falls into some receptacle to be immediately packed for sale.

Maceration and Extraction.

The following is a letter written by Dr. Walter Maxwell, Director of the Sugar Experiment Stations, Queensland, on the subject of the extraction of juice from the sugar-cane. This important subject is treated by Dr. Maxwell in such a common-sense manner that we place this letter on record as an important contribution to the literature of sugar manufacture:—

In reply to your questions bearing upon high extraction of juice from the cane with and without heavy maceration, I may say that my views are very well known, covering this matter. I have had occasion to discuss the subject several times, and in relation to the factors which essentially control it.

It must be clear, in the first place, that the sugar manufacturer in one country, where fuel is £2 per ton, and the sugar maker in another country, where coal is merely 12*s.* per ton, cannot approach the question of high extraction from the same standpoint.

Again, the sugar maker who is dealing with a cane containing 10 per cent. or 12 per cent. of sugar is surrounded by necessities that the sugar maker knows nothing about who is handling high-class cane containing 15 to 20 per cent. of sugar. The state of maturity, and the relative richness and purity of the cane, with the cost of fuel, govern, first and last, the question of low, medium, or high extraction.

In discussing the value of high extraction in the manufacture of medium or high-class cane, the business question is not what sugar is extracted, but what is exactly obtained in marketable shape.

It is clearly pure waste of labour, fuel, and time to express, by excess of water, 1 lb. of sugar that we

cannot put into bags, therefore the question that I have already often dealt with remains still the same—to what point of degree of extraction can we go and obtain the sugar that we extract? This is, and must always be, the technical business-man's first consideration. Total extraction is possible, but it is nonsense in practice. Beyond a given degree, governed by the quality of the cane, but also with best of cane, extraction does not only not increase the yield of marketable sugar, but it can actually lessen it : increase of molasses, and usually of higher sugar content, is the result.

A word or two indicating what it actually means, on the one hand, to gain a per cent. in extraction, and what, on the other hand, it means to increase the molasses per ton of sugar, and therewith increase the sugar content of the molasses which usually follows as a result of bringing out more of the impurities that get in the way of crystallization.

If we take as a basis a crop of 10,000 short tons or 20,000,000 lb. of sugar, then each per cent. is equal to 100 tons. We therefore estimate that for each per cent. of extraction over, say, 94 per cent. (high-grade cane) 100 tons of sugar is brought into process of manufacture. That is, the extra one per cent. gives the opportunity of making 100 tons more sugar on the basis of the 10,000-ton crop. On the other hand, 25 gallons (American) per ton of sugar means a very low average, 250,000 gallons or 3,000,000 lb. upon a 10,000-ton crop. One gallon of molasses is therefore equal to 120,000 lb., and if the molasses are composed of one-third cane sugar, and the average is higher than this by double polarization, then 1 gallon of molasses upon a 10,000-ton crop is equal to 20 tons of sugar. An increase, then, of 5 gallons of molasses per ton of sugar by heavy maceration would be equal to 100 tons of sugar upon the 10,000-ton crop, or one per cent. of extra extraction.

Again, one per cent. increase of cane sugar left in the molasses, at the rate of 25 gallons per ton of sugar, is equal to 15 tons of sugar (or 18 tons of the molasses is increased to 30 gallons per ton of sugar) upon a 10,000-ton crop. In brief, if in the attempt to raise the extraction from 94 per cent. to 95 per cent. by excessive use of water, or by returning third-roller dilute juices, the molasses should be increased 3 gallons per ton of sugar, and the sugar content of the molasses raised by 2 per cent., then the extra 100 tons of sugar brought into the manufacture by the one per cent. greater extraction is valueless, for it is never obtained, and the fuel, labour, and time spent are thrown away. If chemists, and the technical controllers of sugar houses, will keep steadily in view the extra sugar obtained, instead of mere increase of extraction, they will be working towards something actual; and if to this they will add the account of cost of obtaining the extra sugar under varying prices of fuel, then they will be able to render a strictly business statement of their work. Of course, I am not dealing with the gross difference between the work done by old-time and modern-time high-power mills, but rather with extractions of the best mills, upon high-grade cane, with large volumes of water, and the actual economic results.

In the matter of varying qualities of cane, I have reason to believe that, with the grades of cane containing 10 per cent. to 12 per cent. of sugar, any extraction over 88 per cent. or 90 per cent. only goes to make molasses, and with the best quality of cane, say, a sugar quality of 16 per cent. to 18 per cent., we are yet without evidence that any extraction above 95 per cent. has resulted in any gain of marketable sugar. On the other hand, there is ample evidence that excessive maceration and a forced extraction have actually led to a loss of obtainable sugar. This has been shown by me in earlier publications.

RATS CLEARED FROM AN EGYPTIAN PUBLIC GARDEN BY LIZARDS.

The following note on lizards clearing field rats from the Delta Barrage Public Gardens, Egypt, has been forwarded by Mr. Walter Draper:—

The Government Gardens, Delta Barrage, near Cairo, have for some time suffered considerably from damage caused by the Egyptian field rat, which congregates in large numbers on raised lands and canal banks throughout the country, particularly during high Nile. This species, which is eaten by negros, has not the nocturnal habit of the house rat, from which it differs in having a smaller head, less pointed nose, and its hair, which is a dark colour tipped with brown, is coarse and somewhat erect. Its favourite feeding time is late afternoon, when it attacks the bark of tender trees, young bamboo shoots, stems of ivy, etc. It causes considerable damage to rockeries and stone revetments by the quantity of earth it removes when burrowing. It is easily trapped, but large numbers when established make complete eradication difficult.

Four or five years ago some twenty lizards (*Agama stellis*) of a dark, rough-backed, tree-climbing species were introduced by the writer into the gardens from Alexandria.

This reptile, which is about 10 inches long, runs with great rapidity, and is of a somewhat striking appearance, like a small crocodile. The fact that the gardens are protected on three sides by the Nile has probably been of some assistance in locating these lizards in the gardens, where they have now increased considerably. Their favourite haunts are holes in rockeries made by rats, and also in decayed portions of trees.

A few years ago the rats began to disappear, as the lizards increased, until a rat in the gardens is now very rarely seen. The writer was informed by a gardener that he had seen a lizard with a young rat or mouse in its mouth ; but unfortunately, I am unable to vouch for the accuracy of this statement. Sufficient, however, is that the damage caused by field rats has now ceased, and the large lizards form by no means an unpleasant feature in the animal life of the Public Gardens.

Chameleons have been introduced from the desert, but so far without success.

PARA RUBBER.

In the *Annual Report* on the Federated Malay States for 1903 the Resident-General says:—

I am not in a position to give the figures of acreage under Para rubber cultivation, but it is extending rapidly, and the most sanguine hopes are entertained—and reasonably entertained—as to its prospects of success in these States. Export in quantity has not yet commenced, but adequate authorities have reported that our samples are equal, if not superior, in quality to Ceylon rubber, which has hitherto headed the market, while experienced visitors from that colony and from Java pronounce the growth of the trees to be magnificent. Sources of natural supply of rubber appear to be shrinking, while, at the same time, new uses for the article are being found, and its consumption is increasing. It may reasonably be expected that, as with cinchona, cultivated Para will beat the wild product. The prospect for our Para rubber planters appears to be most favourable; additional areas are being brought under cultivation, companies and syndicates are being formed, and it is hoped that over-capitalization will be avoided.

WEST INDIAN FRUIT.

BANANAS AND PINE-APPLES IN QUEENSLAND.

In the annual report of the Queensland Department of Agriculture for 1903-4 the following reference is made to the cultivation of bananas and pine-apples:—

The area under bananas increased by 1,311 acres—from 5,266 acres in 1902 to 6,577 acres in 1903. The total production, however, notwithstanding the increased area, shows a reduction of 47,437 bunches, the figures for the two years being 1,160,015 bunches and 1,112,578 bunches respectively. This fruit forms the principal article of export at Geraldton and Cairns, and it has been necessary to increase the number of inspectors at the former place to safeguard the southern trade. Though every effort is made to induce the shippers to send but the best fruits to market, these efforts are severely handicapped by the treatment this delicate fruit receives on board ship and on the wharves. There is room for much improvement in this connexion, and as the trade is of some considerable value to the shipping companies, it is thought that it would be to their interest to devise better means of handling, so that the fruit could reach its destination in better form. In one case during last year some thousands of bunches out of one ship were condemned in a southern port and destroyed, and it was ascertained on investigation that the principal cause was owing to the wet weather during the voyage, which necessitated the holds being closed down during the greater part of the voyage. A free circulation of air, so necessary to this delicate fruit, was thus excluded. The loss on this consignment to the growers was something considerable.

The area under pine-apples increased from 1,101 acres in 1902 to 1,493 in 1903, an addition in area of 392 acres. Of this fruit the Brisbane district carries the largest area, viz., 601 acres, followed by the Logan with 206 acres. During the year many experiments have been made to test the keeping qualities of this fruit in view of an export trade, but though they have been successful up to a certain point, the carriage over-sea in the cold room has not yet been accomplished. Attention has been given to the canning factories in the direction of canning, and a trade with the western States is in a fair way of being established; but competition with the Straits Settlements, which enjoys the advantage of a free port and a goodly supply of cheap labour, has to be overcome. Inquiries have been made as to the system of manufacture in vogue at Singapore, and the results of these inquiries have been placed at the service of those interested.

COCOA-NUT OIL INDUSTRY IN JAMAICA.

The following memorandum on the above subject has been prepared by Mr. John Barclay, Secretary of the Jamaica Agricultural Society:—

Before the hurricane in August 1903, Jamaica exported about thirty millions of cocoa-nuts, value £68,000. The hurricane destroyed 75 per cent. of the bearing trees and injured the remainder so materially that they have not borne much this year. The shortage of cocoa-nuts was so bad that a soap company which depended mostly on cocoa-nut oil for making its soap has had to shut down. There is not much land available to take up for growing cocoa-nuts unless a going plantation were purchased. Some of the sugar estates in Trelawny that have been going out of cultivation would form very suitable spots, and the soil would be in very good condition for planting cocoa-nuts. Such lands could not be compared in price, which might be £2 to £4 per acre, with the large stretches available in Central America, such as the Mosquito Coast, where land can be got on nominal terms; but, on the other hand, we have a settled and peaceful population and conditions of civilization all around; we have good laws, good roads, good shipping facilities, and no such enemies to cocoa-nuts as do such extensive damage in South America—squirrels, monkeys, etc.

I am afraid this year and next year cocoa-nuts will not be plentiful enough here to be got at anything less than the market price as quoted in New York.

ORANGE INDUSTRY IN PORTO RICO.

The following reference to the orange industry in Porto Rico is made by Professor Earle in the Annual Report on the Experiment Station:—

Many thousands of orange trees have been planted during the past two years, and the indications are that these plantings will be largely increased in the near future. The prospects for developing a successful orange industry seem very flattering. There is an abundance of suitable land at reasonable prices. The quality of the fruit is good. Cheap labour, cheap freight rates, and the absence of tariff charges will make it possible to place Porto Rican oranges on the American market in competition with those grown in other countries. The climate is favourable, and so far no diseases or insect pests have been observed that are not to be encountered elsewhere with equal severity. Numerous kinds of scale insects occur, any one of which would be capable of doing great harm, but each seems to be held in check by one or more natural enemies.

COTTON INDUSTRY.

Antigua.

From returns supplied by Dr. Watts we learn the following particulars as to the prospects of the cotton crop in Antigua:—

During the present season (1904) there are upwards of 500 acres under cotton. Last year it was estimated that there were about 600 acres.

The cultivation of the present season is in better order than that of last year.

Grenada.

The following letter in reference to the cultivation of cotton in Grenada has been received from the Colonial Secretary:—

I am directed by his Excellency the Governor to inform you that, from inquiries made, it appears that the approximate area under cotton cultivation this year in this colony is about 4,120 acres, being 120 acres in the island of Grenada and 4,000 acres in the Carriacou District. Of this 32 acres are said to be in Sea Island cotton, of which 414 lb. of seed have altogether been issued. No return of the quantity of seed planted is obtainable.

The prospects of the crop are at present very favourable, and an estimate thereof places the total probable amount at 1,550 bales of 350 lb. each.

Barbuda.

The following information regarding cotton growing in Barbuda has been communicated by Mr. H. G. Branch, Acting Manager:—

The land planted in cotton this year had all been used before as provision gardens, but, with the exception of a few acres, had been abandoned five or six years ago and had grown up again in thick bush. After the land had been cut down and burnt off, it was thoroughly hoed over about 4 inches deep, and all stumps and roots were removed. There are 29 acres at present under cultivation; 22 acres were planted on August 13, and the rest five or six weeks after. Those planted on August 13 have just had their last weeding, as they are now 4 to 5 feet high and meeting between the rows, and certainly show very vigorous growth. The trees were planted $3\frac{1}{2}$ feet by $1\frac{1}{2}$ feet. Of the 29 acres planted, 22 are in Sea Island cotton, the seed of which was kindly procured for me by the Imperial Department of Agriculture; 5 acres in Sea Island seed grown in Antigua, and the rest in Seabrook seed.

Large numbers of worms appeared on the weeds and vines before the first weeding and, of course, when these were weeded up, the worms attacked the cotton which was then about 12 inches high; but I found hand-picking at this stage quite effective, and no harm was really done to the cotton, so long as the land was kept free of weeds.

The worms appeared again on the high cotton three weeks ago, but a liberal dusting with Paris green has wiped them out, at least for the present.

The bolls are now forming, and I have every reason to believe there will be a good crop, as the trees are wonderfully free from any disease; my only hope is that I may have the means to extend the cultivation next year.

The expense incurred in the cultivation of all the cotton has been defrayed from the £100 given by the British Cotton-growing Association for experiments in Barbuda.

Nevis.

Mr. J. Spencer Hollings, Agricultural Instructor at Nevis, has forwarded the following report on the prospects of the cotton crop in that island:—

Returns for 800 acres are now in, and I am sure that the area under cultivation cannot be much, if any, less than 1,000 acres. The weather since the end of July has been all that could be desired.

Worms have been very troublesome and have required the utmost vigilance, but Paris green has so far effectually protected the plants from any serious injury. Other pests have given us but little trouble. A large caterpillar which seems to be more at home on the weed 'purslane' than on cotton, but looks like an overgrown cotton worm, has done a little damage, but Paris green kills him promptly.

Distance apart and mode of planting vary very considerably, from 3 feet by 20 inches to 5 feet by 2 feet, for the former, to every possible position between the bottom of the furrow to the crest of the ridge, inclusive of flat planting, for the latter.

The condition of the plants is very satisfactory throughout the island, and for all the various stages of growth. Here again a wide divergence of practice is shown, as some fields were planted as early as June and from thence on to the present, each month having its representative plots.

Jamaica.

Mr. John Barclay, Secretary of the Board of Agriculture, Jamaica, has written as follows in regard to cotton planting in Jamaica:—

To this date there have been sent out within the last six months 4,500 lb. of Sea Island and Egyptian cotton seed, and numerous experimental cultivations, mostly of a very small area, are in process. Between March and September there have not been more than 100 acres of cotton grown; the crops from these are now being reaped and some of the results are exceedingly encouraging, even as much as 400 lb. of clean cotton being obtained per acre.

Several experimental cultivations have failed completely, but the reasons for the failure are plain to us and are due either to planting in May, which is a month too late, or to the locations being unsuitable. Sometimes Sea Island cotton fails on certain soils, while Egyptian flourishes, and, in a few cases, vice versa. As a rule, however, the Egyptian cotton has been found the safer variety to plant, being more robust in growth and the cotton not so susceptible to damage by heavy rains as the Sea Island.

On the whole, results have been fairly encouraging, and the acreage planted in cotton is being increased, though still cautiously. I estimate that there will now be about 300 small cultivations, ranging from a chain up to 5 acres.

It was unfortunate for us that we took up planting rather late in the spring, so that cotton has been coming in late in September and the beginning of October when heavy rains were falling. In consequence, fresh seed was not available for the planting season that suits the greater part of the island, viz., between August 15 and September 15.

But for the difficulty of getting seed there would have been a larger acreage planted, but many have had to give up their idea of it, when the proper time for their district passed. I find it is the same with cotton as with corn—whatever is the season for planting corn in any district is the time for planting cotton, and good results will not be secured out of that season.

SCIENCE NOTES.

Wild Tamarind Trees.

There are in the West Indies two leguminous trees known by the name of 'Wild Tamarind.' This is apt to lead to confusion, and it should be mentioned that the tree referred to in the *Agricultural News* (Vol. III, p. 314) as a food plant of the cotton worm in Antigua was not *Pithecolobium filicifolium*, as stated there, but the other wild tamarind, viz., *Leucaena glauca*.

In Jamaica it is *Pithecolobium filicifolium* that receives the name 'Wild Tamarind.' This is a large tree, native of the West Indies and Central America, with finely divided leaves. Its whitish flowers are borne in long, peduncled heads. The most striking feature of the tree is the twisted, scarlet pod, blood-coloured within, which bears black seeds (often used as beads). The tree grows to a considerable size, its diameter being usually about 3 feet. The wood, which takes a fine polish, is much used in building for flooring and other work.

The wild tamarind of Barbados and the Northern Islands is, however, *Leucaena glauca*, also known in Barbados as 'Mimosa.' This is the plant from which are obtained the well-known 'Mimosa' seeds, so much used for ornamental work, such as necklaces, bracelets, etc. This common and well-known shrub is spineless, its branches and petioles are powdery, with four- to eight-paired pinnae and leaflets ten- to twenty-paired, glaucous beneath. The pod is broadly linear, 5 to 6 inches long with flat, brown, shining seeds.

Anatomy of the Leaves of British Grasses.

A paper on the above subject by Mr. L. Lewton-Brain, B.A., F.L.S., is published in the *Transactions of the Linnean Society* (Vol. vi., part 7). On account of the important position occupied by grasses in British agriculture, Mr. Lewton-Brain's paper is likely to prove of considerable value to agricultural botanists.

The author refers to the fact that the anatomical structure of the leaves as seen in cross section is a valuable aid in the identification of many of the grasses. This is specially the case when the grasses are not in flower. The paper is divided into three parts:—(i) General anatomy and histology; (ii) brief descriptions of the leaf-structure of all the grasses examined by the author; (iii) a grouping of the grasses according to habitat.

In part ii descriptions are given of the leaves of some ninety grasses, the descriptions being accompanied by seventy-five original diagrams and drawings, for the most part transverse sections of leaves.

Part iii is devoted to a study of habitat with a view to discovering how far the leaf-structure is constant throughout an oecological group. The grasses examined are divided into the following seven groups according to habitat:—(i) Meadows and pastures; (ii) waste and sandy places; (iii) woods and shaded places; (iv) maritime sands; (v) moors and heaths; (vi) wet places; (vii) Alpine grasses. It is shown that each group has certain typical characteristics, but that in every case some grasses have to be described as exceptional for the group. Among the features more or less common to certain groups may be mentioned the form of the transverse section of the leaf, the presence or absence of hairs, distribution of stomata, the amount of mechanical supporting tissue (*stereome*) present and its arrangement, the arrangement of the chlorophyll-containing tissue, the presence or absence of large air-lacunae in the leaf, etc.

Nutmeg Tree.

The following description of the nutmeg tree is taken from the *Pharmaceutical Journal*:—

The nutmeg is the kernel only of the seed of *Myristica fragrans* (N.O. *Myristiceae*). The nutmeg tree is a native of the Molucca Islands, and is cultivated on the islands of the Malay Archipelago, on the Malay Peninusula, and in other tropical countries. It produces a fruit about the size and shape of a peach, the flesh of which dries and splits as the fruit ripens, disclosing a large, brown seed surrounded by a brilliant, crimson, branching arillus. The seed is separated, and the arillus stripped from it and dried, during which process the crimson colour changes to a dull reddish-yellow; it then forms the spice known as mace. After the

Fig. 15. Nutmeg.

Two twigs (reduced) are shown; one bearing three clusters of male flowers, the other with ripe fruit. On the left is a detached flower, and a seed (the nutmeg) covered by its aril (the mace).

[From *Kew Guide*.]

separation of the arillus, the seed is dried until the kernel rattles in the shell. It is then opened, and the kernel removed; the latter constitutes the nutmeg of commerce. Before exportation they are sometimes dusted with lime, or washed in milk of lime and dried, a process that protects them from the attacks of insects, to which they are particularly liable. Nutmegs are imported into this country [United Kingdom] chiefly unlimed; on their arrival they are sorted according to their size, the broken or otherwise defective ones being set aside for the production of volatile (*oleum myristicae*) or fixed oil of nutmeg (*oleum myristicae expressum*, *oleum macis*). Sometimes they are limed in this country to suit the requirements of trade custom.

Further information relating to the nutmeg tree, especially in connexion with propagation by grafting, will be found in the *Agricultural News* (Vol. I, p. 69).

'A. B. C. of Cotton Planting.' A third edition of this publication (Pamphlet Series, No. 31, of the Imperial Department of Agriculture) has just been issued. Cotton growers in the West Indies and elsewhere have found this pamphlet of great assistance. Copies can, therefore, still be obtained of all Agents, price 4*d*., post free 5*d*.

COTTON NOTES.

The measure of success to be attained this year with cotton will depend, in the first place, on the quality of the seed sown and, in the next place, on the attention given to the cultivation and checking the attacks of the cotton worm.

Even where the seed is not of the best quality, a good deal might be done by having the cotton picked very carefully and by keeping the different qualities entirely distinct. The 'Rivers' seed supplied by the Imperial Department of Agriculture may be depended upon, if the cultivation and picking are good, to produce Sea Island cotton of very high quality.

Mr. Oliver is of opinion, from the samples of various cottons submitted to him during his recent visit, that the cotton obtained from the 'Rivers' seed, under favourable circumstances, may be worth from 3*d.* to 9*d.* per lb. more than the bulk of the cotton raised from local seed.

This shows the desirability of planting nothing but the best seed. A crop of cotton of high quality may net £8 to £12 per acre; while a crop of low quality, with exactly the same expense in cultivation, may net only £3 to £5 per acre. It should, however, be borne in mind that no crop can be satisfactory unless the land is well prepared beforehand, the seed is good, the cotton worm is kept in check, and the picking is thoroughly well done.

So far, the attacks of the cotton worm are being very successfully dealt with. In some instances the worm has been allowed to injure the fields, because Paris green and lime have not been kept in stock, and a sufficient quantity has not been available at a moment's notice. In a few instances, the amount of Paris green and lime applied has been more than was actually necessary. This has been specially noticeable in fields with scattered plants, or those where the plants have been of unequal size.

Very soon the most important matter connected with cotton growing will be the picking. Whether this is to be paid for by task or by the day will depend on local conditions. The best plan is to pay a certain price for the actual amount of clean cotton brought in each day. If the cotton is not clean enough, or if unripe cotton is mixed with good cotton, the picker might be required to go over it and thoroughly clean it before being paid.

In many cases bad picking is due to the fact that sufficient care has not been taken in instructing and advising the pickers beforehand: suitable bags must be provided, and it should be insisted that pickers have both hands free; the pods should be firmly grasped with the left hand and the cotton extracted with one steady pull by the right hand.

In weighing the cotton brought in at the end of each day, credit might be given for extra-clean picking. A small reward given in this way might be productive of results as good as, if not better than, keeping back the pickers to repick their cotton the next day. Both plans are being tried, and one or other may eventually be adopted generally.

If the proprietor or manager were to give his personal attention to this question of picking cotton clean and start the work on right lines, it would mean several pounds in his pocket at the end of the season, to say nothing of the good name his cotton would eventually attain.

It is supposed by some that it is the work of the gins to take out bits of leaves and pods and turn out the lint white and clean. This is an entirely erroneous opinion. The gins, by breaking up the bits of leaves and pods into fine pieces, will increase, rather than diminish, the evil. It is the grower's duty to look after the character of the seed-cotton sent to the gin. He will have no one but himself to thank if his cotton contains bits of leaves and pods or is mixed with unripe and weak stuff. The gins cannot help him in details like these.

AGRICULTURE IN ST. CROIX.

The St. Croix *Avis* has the following note on agricultural prospects in that island:—

In regard to St. Croix, a better and more rational system of agriculture is needed. There is wanted a fresh increase of experienced Danish agriculturists to replace the hitherto existing immigration of frequently not very well trained Irishmen and Americans. The sugar cultivation under the poor prices of late years has been worked with but small profits, and most recently even with a loss. By rational methods, both in the cultivation and manufacture, it may very well be possible, now that the Brussels Convention has created a sounder market, to make the continuation of the industry again profitable. It will, however, always be unfortunate for agriculture to place all on this one card, and it is exceedingly desirable that knowledge of other cultures should be diffused, especially those which can be carried on on a large scale, as for example, corn and tobacco, but also others which are adapted to smaller cultivators, as for example, cacao and fruit culture, the cultivation of vegetables for the local market and for export.

The plantation company, 'Dansk Vestindien,' has entered on these tasks, and considerable capital has moreover been invested by individuals, especially in the sugar industry, so that we may hope that agriculture has brighter times before it.

There will be room for young, energetic, Danish agriculturists and gardeners, who have some capital, and the plantation company has already through its engagements appointed several young agriculturists.

Plant Study. The habits of even the commonest plants, especially in their relations to the other organisms about them, are very imperfectly known; and there is not a section of any country in which there is not inviting opportunity of this kind. Especially attractive at the present time are the problems of oecological plant geography,—the study of the reasons why each plant stands where it is, and is of the form, size, and texture it is. Very attractive, too, are the problems in modes of locomotion of our common plants, and in the mechanisms of cross-pollination of many of them. The construction of a local flora in which each plant is not only listed, but located oecologically is everywhere possible, and would be both scientifically and subjectively profitable. (Ganong in *The Teaching Botanist.*)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 367 of this volume.

The *Agricultural News:* Price 1*d.* per number, post free 1½*d.* Annual subscription payable to Agents 2*s.* 2*d.* Post free, 3*s.* 3*d.*

Agricultural News

Vol. III. SATURDAY, NOVEMBER 19, 1904. No. 68.

NOTES AND COMMENTS.

Contents of Present Issue.

The prospects of the cotton crop in the West Indies are discussed in the editorial in the present issue.

The notes on the sugar industry include a valuable communication from Dr. Walter Maxwell, of Queensland, on 'Maceration and Extraction.' (pp. 370-1.)

Further reports on the prospects of the present cotton crop will be found on p. 373. It is desirable to draw attention to the miscellaneous notes on cotton which are likely to be of considerable interest to growers. (p. 375.)

Several short articles of a botanical character are published on p. 374. These include a note on 'Wild Tamarind' trees, a brief review of Mr. Lewton-Brain's paper on the anatomy of British grasses, and an account of the nutmeg tree.

An important report on Jamaica tobacco by Mr. F. V. Chalmers, who recently visited that island for the purpose of inquiring into the industry, is published on p. 379.

Short notices of several publications which are of interest in connexion with West Indian agriculture will be found on p. 381.

This issue also contains Mr. J. Russell Murray's usual monthly report on the position of West Indian products in the Canadian markets. (p. 382.)

Jamaica Tobacco.

We publish on p. 379 an interesting and important report on Jamaica tobacco. While Mr. Chalmers' remarks on Jamaica tobacco are of a decidedly encouraging nature, his suggestions for improving this product should receive careful attention.

An important desideratum is lightness of leaf: Mr. Chalmers found that the majority of leaves were too heavy and suggests that more careful attention should be given to the selection and preparation of the soil. The necessity of possessing a thorough knowledge of the fermentation process is also pointed out. It is a matter for encouragement that Mr. Chalmers is of opinion that, with due care in cultivation and curing, Jamaica tobacco should be able to compete with the very best produced in Cuba. The experiments, now being conducted at Hope Gardens in growing tobacco under shade, should prove of great value in promoting the industry.

Economic Plants in Uganda.

A report on 'Exotic Plants of economic interest in the Botanic Gardens at Entebbe, Uganda,' issued as a *Consular Report*, contains an interesting account of efforts that have been made to establish economic plants in that country.

Among the rubber-yielding plants introduced are Para (*Hevea brasiliensis*), Central American (*Castilloa elastica*), Ceara (*Manihot Glaziovii*), and Lagos silk (*Funtumia elastica*). Specimens of these trees are now growing well.

It has been proved that Uganda can produce coffee of first-rate quality. This indigenous coffee is not *Coffea arabica*, but probably is a distinct species and more closely resembles Congo coffee (*C. robusta*). Other species are also doing well.

As fruit is one of the scarcest commodities of the country, the culture of tropical sorts is being pushed on as fast as possible. A quantity of pine-apple suckers taken from Kew have borne good fruits.

Physic-nut Oil.

The results of examination of oil from the seeds of the physic-nut (*Jatropha Curcas*) are recorded in the *Bulletin of the Imperial Institute.*

The kernels constituted about 66 per cent. by weight of the whole seeds, which were found to yield 52 per cent. of an oil which had a yellow colour, a faint, peculiar odour, and a bland, nutty taste.

These seeds are exported by the Portuguese Colonies to Lisbon where curcas oil is manufactured from them. This oil belongs to the class of semi-drying oils and is employed in the manufacture of soap and candles. It is a strong purgative and in India is used medicinally. Brokers to whom samples were submitted valued it for soap making at not more than £14 to £15 per ton. On account of the purgative action of the oil, the cake left after extraction could not be used for feeding purposes, but would be worth about £2 to £3 per ton as a manure. The value of the seeds would therefore be from £4 to £5 per ton.

British Cotton-growing Association Deputation.

As stated in the last issue of the *Agricultural News*, the Deputation from the British Cotton-growing Association left Barbados in the company of Sir Daniel Morris on Tuesday, November 1, for the Northern Islands.

Wednesday, November 2, was spent at St. Lucia, where addresses were delivered by Sir Daniel Morris and Mr. Oliver at a meeting of the Agricultural Society (the Administrator, Sir George Melville, K.C.M.G., in the chair). An interesting meeting was held at Montserrat on Friday, November 4, his Honour the Commissioner being in the chair. The meeting held at Antigua on Saturday, November 5, presided over by his Excellency the Governor, was large and representative. At St. Kitt's his Honour the Administrator presided over a good meeting on Monday, November 7 ; at Nevis also a large meeting was held, Mr. Bromley again occupying the chair.

At all these meetings Mr. Oliver gave most useful addresses which were listened to with great interest by all classes of the community. Resolutions of thanks were passed to the British Cotton-growing Association and to Mr. Oliver.

It may be mentioned that in the various islands visited, the cotton was looking extremely well, and it was evident that growers were taking great interest in the success of the crop.

The Cocoa-nut Industry.

The Times (Weekly Edition Supplement, of October 14) has an article on the cocoa-nut industry. Figures as to the importation of cocoa-nuts into the United Kingdom are not available, but the imports of cocoa-nut oil in 1903 amounted to 782,632 cwt. of the value of £994,676. It would appear that in this matter the empire is self-supporting, nearly the whole of the imports being from British possessions, chiefly Ceylon, but also New South Wales, Madras, and Mauritius.

The United States Department of Agriculture has made an exhaustive inquiry into the culture of the cocoa-nut and its products. Cocoa-nut production is a factor of economic importance in the island possessions of the United States. In the Philippines copra constitutes one of the chief items of the export trade, bringing to the archipelago from two to four million dollars a year. In Porto Rico the area in cocoa-nuts is about 5,500 acres.

From none of these sources, however, does the United States obtain any large proportion of its heavy imports of cocoa-nuts and their products. These enter the United States as nuts in the shell, as copra, and as cocoa-nut oil. The imports of nuts amount to 40 to 50 millions. The aggregate value of cocoa-nut oil, cocoa-nuts, and copra delivered for consumption into the United States last year was close on four million dollars. The nuts are derived almost exclusively from the British West Indies, Colombia, Cuba, Honduras, and British Honduras ; the oil from Ceylon and Cochin.

Exports of Lagos.

According to the *Annual Report* on Lagos, the principal items of export from the colony in 1903 were palm kernels and palm oil (£785,859), mahogany (£56,167), rubber (£15,583), and cacao (£6,705). As mentioned in the last issue of the *Agricultural News* (Vol. III, p. 361), there was a decrease in the value of palm products due to an insufficiency of rain. Probably for the same reason, the exports of cacao show a slight decline; there is evidence, however, that there is a growing export in this product.

There was a large increase in the export of mahogany, and the industry is now an important one. A stringent law is required to prevent the cutting of immature trees. The rubber industry is also growing, and efforts have been made to cultivate introduced varieties, but it appears that the indigenous trees have, so far, given the most satisfactory results.

It is interesting to note that calabashes to the value of £545 were shipped to other ports on the West Coast.

It is stated that increase in the exports may reasonably be expected as regards, cacao, palm produce, rubber, cotton, and corn; while, when the cocoa-nut trees that have been planted out come into bearing, there will be a considerable advance in the export of copra.

Ground Nuts in East Africa.

A writer in the *East Africa Quarterly* recounts his experiences in growing ground nuts. The seeds were sown in August; in the following February, when the plants began to wither, several were rooted up to ascertain the yield. In some instances, as many as 100 to 130 kernels were gathered from one plant; from specimens of the most backward plants about fifty were gathered. With these data the writer concludes that the average yield was about eighty-fold. The seeds having been planted 2 feet by $2\frac{1}{2}$ feet, some 14 lb. of seed must have been planted per acre. An acre, therefore, produced about $\frac{1}{2}$ ton of nuts.

The cost of planting, harvesting, shelling, etc., was estimated at about £1 per acre; the freight charges, at about £3 per ton, came to £1 10*s*. per acre. Adding to this the cost of bagging, etc., the total cost to produce $\frac{1}{2}$ ton was about £2 15*s*. With the price of ground nuts in London at £10, there was a profit of about £2 5*s*.

The writer does not consider these figures very encouraging, but points out that they are based upon the assumption that hand labour is exclusively employed. No doubt, with the use of drilling machines, etc., the cost of production might be considerably lessened.

It should be mentioned that in Barbados a yield of 2,000 lb.—nearly twice that mentioned above—is looked upon as a fair crop, whilst yields of 4,000 lb. are not unknown. It will be seen, therefore, that very satisfactory profits might be obtained in these islands by the cultivation of ground nuts. Full information with regard to ground nuts and their cultivation will be found in Pamphlet No. 25, issued by this Department.

BEE KEEPING.

Nuclei in Queen Rearing.

It has been recommended by prominent queen breeders in the United States that, after raising the young queens by one or other of the methods in vogue, it is best to transfer them to nuclei formed from the strongest colonies—thus having to sacrifice a colony that would otherwise bring in a good return in honey. The following is a short summary of an article in *Gleanings in Bee Culture* for October 15, showing how this may be averted by the use of 'baby' nuclei:—

It is supposed that the young (virgin) queens are between five and seven days old, ready to be placed in the nucleus. There is at hand a special box just large enough to hold a frame, filled previously with honey by some colony. The size of this frame will allow of thirteen of them being placed crossways in an eight-frame, half-depth super. The box opens from above with a close-fitting, water-proof cover. A hole, $\frac{5}{16}$ or $\frac{3}{8}$ inch in diameter, is bored near one of the lower corners of the box right into the frame; over this is placed a little button turning on a central pivot immediately above the hole so that one end acts as a queen excluder while the other closes the entrance. The frame of honey is fixed inside the box so that it is immovable.

Having got your young queens and nuclei boxes ready, proceed to shake all the bees from the combs of some previously made queenless colony. It is most important to have the bees thoroughly filled with honey before shaking. After shaking, place the combs with brood in an empty hive and return them to the old stand. Now, with a small tin cup dip from the cluster of shaken bees about 200, place them in the nucleus box on to the frame of honey, then close it and proceed to dip and fill until all the boxes are filled according to the number of queens ready. Keep the bees confined for ten to thirty minutes in each box and then run in the virgin queen through the little entrance, closing it again. Never wait over-night to do the introducing. Keep them confined until near sunset of the next day, then remove them several hundred yards away. They can, of course, be moved about 2 miles away along with the hive containing selected drones. After the third day turn the button until the zinc queen-excluding slot covers the entrance. When another batch of virgins is ready, or at your convenience, the fertilized queens in the nuclei can be caged and put in what are known as 'nursery' hives. Some of the advantages of this system are :—

1. It will permit of the use of virgin queens from five to seven days old, with practically no loss.
2. There is no loss from absconding.
3. We avoid all trouble from fertile workers.
4. We can control the fertilization of our queens to an almost absolute certainty.
5. We can proceed with the production of honey ; and in order to raise large quantities of queens we are not compelled to break up into nuclei so many of our best colonies of bees as is done by the methods now in use.

PRUNING TREES.

We have frequently referred in the *Agricultural News* to the great damage done to trees by careless pruning. With the object of affording information as to the best methods of pruning—so as to minimize the damage to the tree—we publish the following extracts from an article in the Trinidad *Bulletin of Miscellaneous Information* :—

In pruning away the large branches from street trees it is necessary to observe great care. When it is determined to cut off a large limb, the first thing to be done is to lighten the weight of the same by trimming off its smaller branches and leaves, and then to secure it by fastening the rope about midway of its length so that it will balance when cut, the free end of the rope should be passed over the crutch of a higher and stronger branch and thence to the ground, where it should be secured by a workman around the base of any other tree, so as to enable him to take the weight of the branch as it is severed from the trunk. The branch should then be cut with the saw or axe some 2 or 3 feet from the point at which it is desired to remove it, leaving a stump some 2 or 3 feet long. The object of this is to prevent the tearing or stripping of the bark, which would otherwise take place, when the weight of the branch causes it to fall. Supported by the rope, the only stripping which will occur will be on the 2-foot stump, but as this is eventually to be removed, it will not matter. When the branch is cut through and lowered gently to the ground, the stump which is left should then be cut away, first securing it in the same manner and lowering and supporting its weight by the rope while cutting.

Begin the cutting of the stump by making a cut with the saw on its underside, and then finish by cutting quite close to the main stem from above. As soon as the branch is removed, the chisel should be used to clean and smooth the surface of the wound, which should then be covered with a coating of coal tar.

The object in cutting the branch close in to the stem is to enable the tree to heal the wound by a growth of cambium from its edges, which will eventually cover and secure it from the weather. If a stump is left, it will assuredly die back, and the dead wood remaining in its centre will prevent the cambium from growing and covering up the wound. Smoothing with the chisel prevents the lodgement of water, and the coating of coal tar preserves the wood by keeping off the spores of microscopic fungi which cause decay. The cut should always be made in a sloping direction, so as to shed any water that may fall upon it.

Experiments in planting Cocoa-nuts. Professor J. B. Harrison, C.M.G., M.A., has forwarded to the Imperial Commissioner of Agriculture a series of photographs illustrating experiments which he has commenced in British Guiana to decide the best method of planting cocoa-nuts, more especially the position in which the nuts should be placed in the holes. Two cocoa-nuts were planted in September 1902, A placed horizontally, and B vertically. The former germinated about four weeks earlier than the latter. In December 1902 they were planted in similar positions in large holes filled with a specially formed compost of soil, sand, burnt earth, and stable manure, under very favourable conditions of drainage, etc. In July of this year both looked healthy, but A was over 8 feet high, while B, checked in development, was less than 5 feet in height.

JAMAICA TOBACCO.

As was briefly stated in the *Agricultural News* (Vol. III, p. 300), upon the suggestion of the Imperial Commissioner of Agriculture Mr. F. V. Chalmers recently visited Jamaica to report upon the position of the tobacco industry. The following is Mr. Chalmers' report to the Colonial Secretary :—

Generally speaking I find the tobacco of good quality and flavour, but the majority of the leaves are of a heavy nature ; consequently from a commercial point of view such tobacco cannot compete with other productions for the purposes of cigar wrapper in particular and for cigar purposes generally, because when tobacco is of a heavy nature it is obvious that the weight of a given number of leaves is greater than when the tobacco is of a finer texture. This is a most important point when competing with a country like Great Britain where the duty is very high. The quality of the tobacco, that is to say, the flavour or aroma, is in nearly every instance excellent.

The foregoing remarks apply to the great proportion of the tobacco now being produced, but I think that if more attention were given to the soil upon which this tobacco is grown, so that it was made of a lighter nature, a finer and a lighter tobacco from every point of view might be produced. It must always be remembered that tobacco cannot be produced or determined by a chemical analysis. The quality of some vegetable productions is largely decided by a determination of its starch, such as the potato or maize, and other percentages, but the quality of tobacco appears to be determined only by the senses of man; colour, texture, aroma, and combustibility are the points by which the quality of tobacco is estimated. Organic and inorganic salts seem to have considerable effect on these qualities. The organic compounds seem to bear a closer relation to the aroma of the tobacco, while on the inorganic salts depends largely the combustibility. A large proportion of potash in the tobacco improves the burning, and when potash is present in the form of a carbonate the best results are obtained. The growers of bright tobacco find that the tobacco grown on the land immediately after the ploughing under of a leguminous crop is deficient in texture and colour. The bright tobacco planters frequently allow their land to grow up to grass and weeds for a year and plough this under that they may have the land in the best condition for a fine crop, but this is a system applied to the production of American tobacco, namely, Virginia, which is of a strong nature and might not apply for the production of a fine cigar leaf, but the value of wood-ashes as a rule can be safely relied upon as a good expedient.

I now come to the shade-grown tobacco which has been produced at Hope Gardens, and I am pleased to be able to report that, with one or two objections in the leaf, the product has every appearance when perfected of being a type of tobacco which is hardly likely for the purpose of cigar manufacturing, principally from a wrapper point of view, to be excelled by any other tobacco of the world, and from the estimate prepared by the Hon. W. Fawcett of the cost of such production in my opinion a very lucrative industry should arise in Jamaica. But let me clearly say that the tobacco must be produced in a thin, good colour, that is to say, a light, level colour, free from spots and of a strong texture, and last and by no means least, a positive knowledge as to fermentation must be applied or the whole proceeding will be a failure, because two fatal conditions will arise, viz., the flavour or aroma of the tobacco will not be perfect and the tobacco will be tender and on account of its extreme thinness very liable to break and consequently would be useless as a cigar wrapper.

Tobacco that is essentially grown for the purpose of wrapper is in nearly every instance the least good for any other part of a cigar, and furthermore, to produce a fine cigar wrapper, such as I firmly believe can be produced in Jamaica, would present a competitive quality only to be found in the very picked of Cuban productions, viz., it will contain a delicious flavour, which should make it very valuable indeed, more especially as it is universally admitted that at the present time there was never so much tobacco and it was never so bad. This remark applies in particular to the whole production of Havana.

Hitherto, as far as my experience goes, the tobacco of Jamaica has never been used as a pipe tobacco, but having regard to the great depreciation of American tobaccos generally and the general desire of smokers for a mixture or blend of tobaccos of varying flavours, I see no reason why this excellent tobacco, though of a thick nature, should not form one of the ingredients in such mixtures for the pipe. With that end in view it is my intention to bring the matter before some of the manufacturers of Great Britain.

GENERAL HINTS FOR THE GUIDANCE OF EXHIBITORS AT SCHOOL SHOWS.

A useful leaflet has been published by the Botanical Department of Trinidad giving 'Hints for the guidance of exhibitors at School Shows.' Notes as to mode of packing and preparation, good qualities, etc., are given for each of a large number of garden crops—vegetables and fruits—as well as the following general hints, which are likely to be welcomed by school teachers and also general exhibitors :—

Cut fruits, i.e., bananas, plantains, oranges, and tomatos when 'full' or one to two days before the date of despatch, in order to 'condition' or 'wilt' the skin. When once wilted they can be much more safely handled. Fruits such as oranges and tomatos should have short stalks left attached to the fruit.

Handle all produce carefully to avoid bruising. A blow that will break an egg will damage and destroy a fruit, although its effect is not at once seen. If possible, each kind of produce should have a separate package, but several small packages may be put together in a larger one, if there is no danger of bruising the produce by so doing. Vegetables should be prepared on the afternoon of the day previous to the show, or as early as possible on the morning of the show-day, so as to have them fresh.

Light boxes such as those used by mustard and sweetmeat manufacturers, biscuit tins, and other similar receptacles would be found very useful, and a stock of these with packing materials should be obtained two or more days previous to the show.

Quality always counts more than size. Produce often has a low value on account of being too large and coarse.

Avoid staging more than the required quantity. For instance, if six tomatos are required by schedule, do not stage seven because you have seven good ones, or for any other reason. If doubtful of quality, exhibit separate samples. Exhibitors can take only one prize in each class, but they may stage three or four samples. Put small fruit and vegetables on plates, with, in the case of fruit at least, a few healthy leaves of the plant to which the exhibit belongs. Always allow plenty of time to stage exhibits by forwarding them early to the show-room.

GLEANINGS.

The *Toronto Saturday Night* of October 22 contains an illustrated sketch of a trip from Canada to the West Indies. Good illustrations are given of typical West Indian scenery.

The twenty-third annual sale of stock is to be held at Valsayn, St. Joseph, Trinidad, on Wednesday, January 11, 1905.

At a meeting of the Trinidad Agricultural Society held on November 8, Professor Carmody read a paper on the 'Manurial aspect of our increasing Exports of Cacao.'

At the same meeting it was announced by the Colonial Secretary that the increased reward for the destruction of the mungoose was having a wide-spread effect in killing out the pest.

We have received a pamphlet (122 pp.) entitled: 'Trinidad to Manitoba and Back,' compiled by Messrs. C. W. Meaden and W. C. Jardine. The notes on this trip are reprinted from the Demerara *Daily Chronicle.*

An attempt is being made by Messrs. Garnett & Co. in British Guiana to develop an export trade in bananas. A small shipment was made by the R.M. steamer which left on October 20.

According to Board of Trade statistics, during the three months ended September 30 last 51,269 bales of cotton were imported into the United Kingdom from British India, 874 bales from the British West Indies, and 876 bales from British West Africa.

It is gratifying to observe, from statistics recently published as to the exports from Jamaica during the first half of the year 1904-5, that nearly all the items show a large increase over the exports for the corresponding period last year.

According to the annual report of the Industrial Section of the Indian Museum, Calcutta, the average percentage composition of dried tubers of yams was: Fat, 1·02; albuminoids, 10·87; carbohydrates, 77·01; fibre, 5·16; ash, 5·94; nitrogen, 1·73.

During the fortnight ended October 20, 25 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West Indian, 4·87*d.* to 7*d.*; West Indian Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb. (*West India Committee Circular.*)

We note with regret the death of Mr. J. Ch. Sawyer, the author of several works on essential oils. Mr. Sawyer had from time to time contributed notes to the *Agricultural News,* and had recently published in the *Chemist and Druggist* a valuable paper on 'Citronella and Lemon grass.'

The Imperial Commissioner of Agriculture has received from Mr. J. H. Hart, F.L.S., specimens of a stalk-eyed crustacean which lives in the sand on the sea-shore and is used by the peasants in Trinidad for food purposes. The specimens have been sent to the British Museum for identification.

It is a remarkable fact that in a country producing so many descriptions of vegetable fibres as are to be found in Madagascar, machinery for treating fibres is unknown, all preparation being still done by hand. The value of the raffia fibre exported during 1903 was £73,535. (*Consular Report.*)

Strenuous efforts are being made by the Dominica Agricultural Society, with the support of both the Government and the Imperial Department of Agriculture, to see Dominica fairly represented at the Royal Horticultural Society's Colonial Fruit Exhibition to be held in London on December 13 and 14. (Dominica *Guardian.*)

The Government of the Federated Malay States has decided to establish an agricultural department in Malay, and has appointed Mr. J. B. Carruthers, the Government Mycologist and Assistant Director of the Royal Botanic Gardens of Ceylon, to be Director of Agriculture and Government Botanist. (*Nature*, October 13, 1904.)

St. Christopher *Advertiser* of November 8 contains an account of the cultivation of cotton at Anguilla. One of the large land-owners, Mr. Carter Rey, has about 60 acres planted and has been supplied by the British Cotton-growing Association with two gins and a baling press. While the machinery is in his possession he will gin and bale cotton at a specified rate.

The following paragraph has been added to the Rules for Elementary Schools at Barbados: 'Twelve cents will be paid for a pass in Object-lessons and Nature Teaching in the Primary Department, provided a sufficient quantity of practical work either in school gardens, or in pots or boxes, has been prepared by the children and is presented for inspection.'

It is announced in *The Times* that the Secretary of State for India has appointed an expert committee to assist in and supervise the preparation of an abridged and revised edition of the *Dictionary of Economic Products of India,* by Sir George Watt, the editor of the original work, which was issued in seven octavo volumes, with index, between 1889 and 1893. The new edition will be compressed into two volumes. (*Nature*, October 20, 1904.)

Mr. G. S. West, M.A., F.L.S., has published in the *Journal of Botany* a paper on 'West Indian Fresh-water Algae.' The author states that the algae forming the subject of this paper were collected by Mr. A. Howard during 1901-2 in the islands of Barbados, Dominica, and Trinidad. Most of the algae recorded are additional to those already known from the West Indies.

DOMINICA AGRICULTURIST, NO. 3: Edited by H. A. Alford Nicholls, C.M.G., M.D., F.L.S. Price, 2*s.* 6*d.*

The third number of this publication—the journal of the Dominica Agricultural Society—has just been issued. It contains the reports of the Secretary and Treasurer for 1901 and a full account of the proceedings of the society for the year 1902.

Six meetings of the society were held during the year 1902 and were well attended. The number of ordinary members was ninety-six.

Several interesting papers were read during the year which are now placed on permanent record. Among these may be mentioned one on 'Citrate of Lime,' by the Hon. F. Watts, a paper on 'Cacao in Dominica,' by Mr. A. R. C. Lockhart, and the prize essay on 'Lime Cultivation,' by Mr. E. A. Agar.

It will be seen that the third issue of this publication is as interesting and useful as the preceding numbers.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PLANT BREEDING AND HYBRIDIZATION, 1902.

This is the official report of the proceedings of the Plant Hybridization Conference held in New York in September and October 1902, and forms Vol. I of the *Memoirs* of the Horticultural Society of New York.

This report has been considerably delayed in its publication, but it is, nevertheless, a valuable contribution to the literature of the subjects on which it deals.

A short account of this conference was given in the *Agricultural News* (Vol. II, p. 17). As stated, among the papers read by delegates were one by Sir Daniel Morris on 'Improvement of the Sugar-cane by Selection and Cross Fertilization,' and one by the Hon. Wm. Fawcett on 'Plant Breeding in Jamaica.' It should be pointed out that Sir Daniel Morris' paper was read more than two years ago, and is therefore not altogether a complete statement of the position now attained.

NATURE TEACHING: Based upon the general principles of agriculture for the use of schools. By Francis Watts and W. G. Freeman. *London: John Murray, Albemarle Street, W., 1904.* Price, 3*s.* 6*d.*

This is an English edition, rewritten and modified to meet the circumstances of British conditions, of Dr. Watts' little book issued by this Department. In the preparation of this edition Dr. Watts has been assisted by Mr. W. G. Freeman, formerly Scientific Assistant on the staff of the Imperial Department of Agriculture.

In the arrangement of the matter this edition follows closely that of the West Indian edition which is now familiar to most of the readers of the *Agricultural News.* It contains, however, a number of illustrations prepared especially for this edition.

Another new feature is an appendix devoted to suggested courses of instruction, which, it is intended, the teacher shall extend and modify as surrounding conditions demand.

This little book should be found very useful by teachers who are engaged in 'Nature Study' work, especially those with school gardens, and is likely to have a good reception.

WEST INDIAN FLORA.

The Nassau *Guardian* of September 10, referring to the recent visit to the Bahamas of Dr. N. L. Britton, Director of the New York Botanical Garden, for the purpose of collecting specimens of the local flora, has the following note respecting Dr. Britton's work:—

His work is part of a general plan for the botanical exploration of the West Indies and Florida, which has already been pursued by representatives of the New York Botanical Garden for several years, and large collections have been obtained from Cuba, Florida, Hayti, Porto Rico, Jamaica, St. Kitt's, Guadeloupe, Martinique, and Dominica. In co-operation with the general plan, Sir Daniel Morris, Imperial Commissioner of Agriculture for the British West Indies, has had a collection made for Dr. Britton in Barbados, and the Hon. Wm. Fawcett, Director of Public Gardens and Plantations in Jamaica, has greatly aided the investigation by contributions of specimens. Professor F. S. Earle, Director of the recently established Agricultural Experiment Station of the Cuban Republic, near Havana, and formerly a colleague of Dr. Britton, in New York, and Professor P. H. Rolfs, Director of the Sub-tropical Laboratory of the U. S. Department of Agriculture, at Miami, Florida, are rendering most important aid, so that the collections of West Indian plants and plant products of the New York Botanical Garden are rapidly becoming very valuable and representative.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, accompanied by the Deputation from the British Cotton-growing Association, returned to Barbados from the Northern Islands in S.S. 'Orinico' on Friday, November 11, and left by the same steamer for St. Vincent. It is expected that Sir Daniel Morris will return to Barbados to-day.

News has been received in Barbados, by cable, that His Majesty the King has been graciously pleased to appoint the Hon. Francis Watts, D.Sc., F.I.C., F.C.S., Government Analyst and Agricultural Chemist for the Leeward Islands, to be a Companion of the Most Distinguished Order of St. Michael and St. George.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, left Barbados in R.M.S. 'Eden' on November 7 for St. Vincent. Mr. Ballou was expected to return to Barbados to-day.

Dr. R. A. Stoute, Veterinary Surgeon to the Imperial Department of Agriculture, has returned to Barbados and resumed his duties on November 7.

WEST INDIAN PRODUCTS.

Canada.

The following report on West Indian products in the Canadian markets during the month of September has been forwarded by Mr. J. Russell Murray:—

Canadian business in general may be considered good, as the realization of harvest hopes are being confirmed and orders from all outlying points are coming forward freely; and within the next five weeks the port of Montreal will be very busy completing the export and import business prior to the closing of navigation about November 15.

Steamship Communication.—In interested circles the steamship communication with the West Indies is gradually assuming a more definite tone, and all the islands and British Guiana should be drawing the attention of the authorities to the necessity of a much improved service and direct communication during the summer months to Montreal. It is mentioned that at least three companies will tender for the contract which is now held by a Halifax firm and which expires in July next. As the consumption of West Indian fruit has largely increased of late years in Canada, and as many as eighteen cars of bananas have arrived in Montreal in a single week during the summer months by rail, this affords proof of the possibilities for a direct service if special fruit accommodation should be insisted upon.

Sugar.—Importing orders have been very limited during the past month, and the dearth of direct West Indian supplies has caused inquiries to go to New York and London, without, however, much success. There are no new arrivals to record since the S.S. 'Degama.' Prices have remained firm, but the lack of offers prevents the ascertaining of the true value of the advance on this market. Granulated stands at 5c. advance above same date for last month.

Molasses.—Good steady business has been in progress, and prices are well maintained, and in many instances an advance has been realized. A recent consignment of choice Antigua molasses has greatly improved the opinion held here of these molasses, and if quality is maintained for next season, we shall find no further difficulty in placing cargo lots. In my report of July last I advised the probability of a combination in molasses in the Maritime Provinces. This has now materialized, and the New Brunswick Importing Company, formed by the St. John and Moncton merchants, as well as the wholesale grocers, is published; the object being that this company will buy in large lots and distribute, thus reducing competition. St. John, N.B., reports an arrival of a cargo of Porto Rico, and that stocks of Barbados are somewhat reduced.

Cocoa-nuts.—Small supplies have been arriving direct, but additional lots have had to be procured in New York. Prices in New York have again advanced considerably, but prices here are only slightly affected.

Spices.—An active demand has taken place during the month. Fruit and vegetable pickling and preserving are in full operation. Prices, however, remain steady. Peppers have advanced.

Fruit.—Business in oranges is steadily improving for West Indian sorts. Jamaicas continue to arrive in fine order and well selected. Dominicas are heavy to move, and greater care in gathering and eliminating faulty fruit must be given. Recent arrivals were very faulty in condition. Prices have been low. The New York advance has not taken effect here yet; it is expected to do so within a week.

The banana trade has fallen off, and prices are nominal. Pine-apples are also nearly over.

INQUIRIES AND NOTES.

Sugar.—I am open to receive offers of 96° centrifugals for prompt shipment and also for December delivery via New York; also for 89° molasses sugars and muscovados, in large or small lots. All muscovado sugars must be dry and free from footings. Offers to be made per 100 lb., c. & f. Montreal.

Cocoa-nuts.—Offers of these will receive prompt attention, shipments to be via Halifax.

Nutmegs.—I have inquiries for sizes 110 to 120's in lots of 10 or 15 barrels. Nuts to be shelled and not limed.

SISAL HEMP IN YUCATAN.

The *Consular Report* on the trade of Vera Cruz for 1903 contains the following interesting notes on the cultivation of sisal hemp in Yucatan:—

Henequen, or sisal hemp, is grown in Yucatan, in this consular district, at an elevation of from 28 to 100 feet above sea-level, on a strip of country generally calculated to be about 40 miles from the sea inwards, in which zone the temperature ranges from 45° to 100° F., with a mean of about 85°. The plant from which this fibre is produced is of the family of the American Agave. It flourishes on arid land where the soil is very thin, resulting in the strength of the plant being driven into the leaves instead of the roots, while the roots appear to run along the surface, and from these the shoots are produced and in turn planted. It is very hardy, producing the whole year round, and from the time of first giving fibre, when about six years old, continues producing leaves for from twelve to eighteen years.

It may be taken that 1,000 leaves at maturity give from 40 to 60 lb. of fibre, and on the cutting of these the life of the plant depends, for, if they are not cut, the plant will pole before time, and once poled the hemp becomes dry, if not entirely useless. The time for cutting the leaves is when they are at right angles to the stem. Weeding is necessary every year, about a month before the rainy season begins, so that the plants may have all the advantage of the rain, and at the same time new shoots are planted. Shoots are cut from the plants at from two to three years of age. The purchaser, if wishing these for use out of the State, would have to pay about $80·00 per 1,000 in addition to the cost of cutting and other charges, as well as a heavy export duty. Purchasers have been known to wonder why they would not grow, not being aware that the grower has been known to boil the shoots to prevent competition in other lands. The leaves are, when ready for cutting, about 5 feet long. After they are cut, the thorns on both edges and the hard points or needles are removed, the leaf then being passed through a cleaning machine, and the fibre when extracted is dried and bleached in the sun. It is then ready for export, and put up in bales of about 160 lb. In 1884, the State of Yucatan exported 233,311 bales; in 1894, 373,833 bales; and in 1903, 590,430 bales.

The principal purpose for which the hemp is used is the manufacture of rope and binder twine. It is generally mixed with some Manila, which is longer and somewhat better. Some of the hemp is shipped to Europe, but the great bulk of it is sold in the United States. The amount exported during 1903 was taken by various countries as follows: United States, 575,167 bales; Cuba, 8,066; United Kingdom, 4,286; Canada, 1,200; France, Spain, Germany, and Belgium, 1,711.

MARKET REPORTS.

London,—October 25, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 21; and 'THE PUBLIC LEDGER,' October 22, 1904.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* per lb.
BALATA—Block, 1/3 to 1/3½ per lb.
BEES'-WAX—£6 to £7 5*s.* per cwt.
CACAO—Trinidad, 56/- to 65/- per cwt.; Grenada, 52/- to 56/- per cwt.; Jamaica, 49/- to 52/- per cwt.
CARDAMOMS—Mysore, 7½*d.* to 2/- per lb.
COFFEE—Jamaica, good ordinary, 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—Jamaica, 10/- to 11/- per box.
ORANGES—8/- to 10/- per box of 150-200.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Fair bright, 45/-; common lean to good ordinary, 25/- to 34/- per cwt.
HONEY—Jamaica, 16/- to 24/- per cwt.
ISINGLASS—West Indian lump, 2/4 to 2/8; cake, 1/3 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 9*d.* to 1/2 per gallon; concentrated, £14 per cask of 108 gallons.
LIME OIL—Distilled, 1/5 to 1/5½ per lb.; hand-pressed, 2/6 to 2/9 per lb.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—1/2 to 1/4; broken, 1/1 per lb.
NITRATE OF SODA—Agricultural, £10 7*s.* 6*d.* per ton.
NUTMEGS—55's, 2/8; 80's, 1/4; 134's, 6*d.* per lb.
PIMENTO—2⅝*d.* per lb.
RUM—Demerara, 8*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
SARSAPARILLA—7½*d.* to 1/3 per lb.
SUGAR—Yellow crystals, 18/6 to 20/- per cwt.; Muscovado, Barbados, 14/- to 15/- per cwt.; Molasses, 12/6 to 16/- per cwt.
SULPHATE OF AMMONIA—£12 3*s.* 9*d.* to £12 5*s.* per ton.

Montreal,—October 9, 1904.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

BANANAS—Jamaica, 50c. to 75c. per bunch of 8 hands; $1·00 to $1·05 per bunch 'firsts'; $1·30 to $1·40 per bunch 'jumbos.'
CEDAR—Trinidad, 40c. per cubic foot.
COCOA-NUTS—Jamaica, $27·00 to $29·00; Trinidad, $20·00 to $25·00 per M.
COFFEE—Jamaica, medium, 9c. to 10c. per lb.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per lb.
LIMES—Jamaica—No quotations.
MOLASCUIT—Demerara, $1·32 per 100 lb.
MOLASSES—Barbados, 25c. to 27c.; Antigua, 21c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 19c. to 19½c. per lb.
ORANGES—Jamaica, $4·00 per barrel, $2·00 per box; Dominica, $2·20 per box.
PIMENTO—Jamaica, 5¾c. to 6¼c. per lb.
PINE-APPLES—Cubans, crates 36's to 10's, $3·00 to $4·10.
SUGAR—Grey Crystals, 96°, $2·70 to $2·75 per 100 lb.
—Muscovados, 89°, $2·50 to $2·65 per 100 lb.
—Molasses, 89°, $2·25 to $2·35 per 100 lb.
—Barbados, 89°, $2·45 to $2·50 per 100 lb.

New York,—October 28, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12¼c. to 13c.; Jamaica—No quotations; Grenada, 11½c. to 12c.; Trinidad, 12c. to 13c. per lb.
COCOA-NUTS—Trinidads, $31·00 to $33·00 per M., selected; Jamaicas, $33·00 to $34·00 per M.
COFFEE—Jamaica, good ordinary, 8¾c. per lb.
GOAT SKINS—Jamaicas, 53c. to 54c. per lb.
GRAPE FRUIT—Jamaicas, $3·50 to $6·00 per barrel.
ORANGES—Jamaica, $2·50 to $4·25 per barrel.
PIMENTO—4½c. per lb.
SUGAR—Centrifugals, 96°, 4¼c.; Muscovados, 89°, 3¾c.; Molasses, 89°, 3½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—November 5, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·60 to $3·75 per 100 lb.
CACAO—Dominica, $11·75 per 100 lb.
COCOA-NUTS—$16·50 per M. for husked nuts.
COFFEE—$10·00 to $12·00 per 100 lb.
HAY—80c. per 100 lb.
MANURES—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
ONIONS—Madeira (stringed), $1·81 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, $2·10 to $2·16 per 160 lb.
RICE—Ballam, $4·90 to $4·95 per bag (190 lb.); Patna, $3·40 per 100 lb.

British Guiana,—November 3, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $7·50 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—$6·00 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 13½c. per lb. (retail).
—Creole, 11c. per lb.
DHAL—$4·20 to $4·25 per bag of 168 lb.
EDDOES—96c. per barrel.
MOLASSES—Vacuum Pan yellow, 16c. per gallon (casks included).
ONIONS—Madeira, $2·00 to $2·50 per 100 lb.; Teneriffe, $1·75 to $2·00 per 100 lb.
PEA NUTS—American, 7c. per lb. (retail).
PLANTAINS—32c. to 60c. per bunch.
POTATOS, ENGLISH—$4·00 per barrel.
RICE—Ballam, $4·40; Creole, $4·40 per 177 lb., ex store.
SWEET POTATOS—Barbados, 90c. per bag, $1·08 per barrel.
TANNIAS—$1·80 per barrel.
YAMS—White, $2·88 per bag.
SUGAR—Dark Crystals, $2·43 to $2·46½; Yellow, $2·90 to $3·00; White, $3·50 to $3·75; Molasses, $2·00 to $2·25 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75, and $5·50 per M.

Trinidad,—November 3, 1904.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, $12·00 to $12·25; Estates, $12·35 to $12·50; Venezuelan, $12·20 to $12·35 per fanega (110 lb.).
COCOA-NUTS—$19·00 per M., f.o.b.
COCOA-NUT OIL—71c. per Imperial gallon (casks included).
COFFEE—Venezuelan—No quotations.
COPRA—$3·00 to $3·10 per 100 lb.
ONIONS—$1·50 to $1·70 per 100 lb.
POTATOS, ENGLISH—75c. to $1·25 per 100 lb.
RICE—Yellow, $4·25 to $4·40; White Table, $4·25 to $5·50 per bag.

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(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the Cotton-growing districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 69. BARBADOS, DECEMBER 3, 1904. PRICE 1*d.*

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The Visit of Cotton Experts to the West Indies.

IN the last two issues of the *Agricultural News* several references have been made to the visit of Mr. E. Lomas Oliver and Mr. Richard Stancliffe, forming a deputation from the British Cotton-growing Association. It may be of interest to review briefly the steps that were taken to enable these gentlemen to form an adequate opinion of the progress that has been made in the establishment of the cotton industry in the West Indies and at the same time to enable cotton growers to profit by the advice the Deputation was able to give them.

During the week spent by the experts in Barbados, visits were paid to a large number of estates on which cotton is being grown; a conference was held with the Barbados Cotton Committee, and on October 29, Mr. Oliver was present at a large public meeting of cotton growers and delivered an interesting address, a summary of which appeared in the *Agricultural News* (Vol. III, p. 359).

On October 31, the Deputation left Barbados, in the company of Sir Daniel Morris, on a tour of the Northern Islands in the S. S. 'Dahome,' by which arrangement it was possible to spend not less than one day in each island. At St. Lucia a meeting of the Agricultural Society was held in the morning, visits being paid later in the day to the cotton plots at the Agricultural School, where cotton of an excellent quality was in course of being picked. A proposal was adopted to start a small Limited Liability Company for the purpose of carrying on cotton growing on a commercial scale and erecting a ginning factory.

At Montserrat visits were paid to the large areas (200 acres) under cotton at Dagenham estate. The plants, everywhere, appeared to be in excellent

condition, and there is a promise of a large crop. If cotton cultivation proves successful on a commercial scale in Montserrat, it will be the means of promoting a great improvement in the circumstances of all classes of the community. A public meeting was held, at which his Honour the Commissioner presided.

The meeting held at Antigua, presided over by his Excellency the Governor, was largely attended by planters, and the proceedings were of an interesting character. The extent of land planted with cotton this year in Antigua is rather less than last year. This may be due to the fact that the prospects of the sugar industry have slightly improved owing to the establishment of Central Factories. A proposal to take over the Central Cotton Factory was suggested to be brought before the Agricultural Society.

In the presidency of St. Kitt's-Nevis cotton cultivation has largely increased, 2,350 acres having been planted this year. Successful meetings were addressed by Mr. Oliver in St. Kitt's and Nevis. The fact that 1,047 acres are planted in cotton this year in Nevis is a striking proof of the value of sympathetic action on the part of the Executive in promoting agricultural development. If nothing unforeseen happens, the value of the cotton to be exported this year from Nevis will reach about £16,000. This would be an appreciable addition to the income of this depressed little island.

St. Vincent was reached on November 12. As this island promises to be one of the most successful in growing the best varieties of cotton, it was resolved to devote special attention to it. At the meeting of planters it was reported that between 1,600 and 1,700 acres were under cotton. Several samples of new-crop cotton exhibited at the meeting were pronounced by Mr. Oliver to be probably the best grown in the West Indies for more than fifty years. During the stay in this island, Mr. Oliver gave the planters a further opportunity to confer with him and show him samples for valuation and report. Numerous visits were paid to estates where cotton was being grown.

On November 21, Messrs. Oliver and Stancliffe embarked at Barbados for Trinidad, where they visited the St. Clair Experiment Station and had an interesting interview with the Governor. They were due to arrive in Jamaica on November 25, where, no doubt, they have found suitable arrangements have been made for fully utilizing their services during their stay.

At every public meeting held in the several islands resolutions of thanks were unanimously passed to the British Cotton-growing Association for the valuable assistance afforded by it in encouraging cotton growing in the West Indies, and especially in connexion with the visit of Mr. Oliver, whose services have everywhere been greatly appreciated. Mr. Oliver's addresses were always received with marked attention. He arranged his facts in so skilful and interesting a manner that he not only won the attention of his audiences, but inspired cotton growers with complete confidence in the success of the industry.

SUGAR INDUSTRY.

Jamaica.

The following extracts from the *Louisiana Planter* special correspondent on the prospects of the sugar industry in Jamaica are of interest :—

All the plantations are preparing for crop time, which is in the latter part of November and early in December. Col. Kitchener, the owner of Lodge's estate in St. Catherine, is contemplating several improvements on his estate and will lay down a light railway about 2½ miles long. The owners of Denbigh estate, for whom the Hon. Geo. McGrath is the local agent, have, it is understood, made plans for the improvement of the property which will involve nearly $25,000 expenditure. A large quantity of new distilling machinery arrived here from England a couple of weeks ago and will shortly be installed on Denbigh estate. At Mona estate new fields have been planted out, and the crop is expected to be an exceptionally large one.

In conclusion, it must be stated that there are indications of a revival of the industry, which, for the following reasons, had almost become extinct:

(1) By the bounty-fed beet, which lowered the price in the English market to a point at which sugar could not be produced at a profit, owing to the antiquated machinery, which was, up to a short time ago, in use on almost all the estates.

(2) The planters throwing up sugar and going in for the more paying banana business. Now they have realized their mistake; the latest sugar machinery is being installed and the area of cultivation extended.

Labour is plentiful and cheap here, and this is a great advantage, but the planter can never again expect the golden days when sugar fetched $200 per hogshead. But that commodity, with modern machinery, can still be made a paying concern.

Varieties of Cane in Hawaii.

Mr. C. F. Eckart, of the Experiment Station and Laboratories of the Hawaiian Sugar Planters' Association, deals with the subject of the varieties of sugar-cane in *Press Bulletin* No. I. The following extract from this paper is of particular interest as it shows that several West Indian canes are giving good results in Hawaii :—

Demerara No. 117 still holds the lead among the recently introduced varieties, and is a promising cane worthy of trial under the diversified conditions of the islands.

Yellow Caledonia, Demerara No. 74, Cavengerie, Striped Singapore, Queensland No. 1, and Queensland No. 7 also produced heavy yields. White Bamboo, Queensland No. 7, Yellow Caledonia, and the unstriped cane which occasionally appears in a stool of Big Ribbon are closely allied; in fact between White Bamboo and Yellow Caledonia there appears to be no difference, and after four years' trial it is impossible to distinguish one from the other.

The following new varieties will be planted out in June of this year and will be harvested in 1906 :—

Striped Tip	Demerara No. 1,937
Daniel Dupont	Queensland B. 5
Demerara No. 115	„ B. 81
„ No. 116	„ B. 147
„ No. 145	„ B. 156
„ No. 1,135	„ B. 176
„ No. 1,483	„ B. 208
Unknown	„ B. 244
Dark-coloured Bamboo	„ B. 306

Some of these are very promising canes and have a noteworthy reputation in other countries, chief among them being: D. 115, D. 145, B. 147, B. 156, and B. 208. Regarding B. 147, one West Indian planter writes: 'B. 147 has the inestimable advantage of being a rough cane outside, with a tough rind, and covered with a coating of dry leaves, which, however, drops off readily when the cane is fully ripe or cut. A spot of this cane which was lately cut for plants, was remarkably free from the common borer, of which it was very difficult to find a single specimen.'

If B. 147 sustains its reputation when tried in Hawaii, it will certainly prove a valuable acquisition in some localities.

Molascuit.

The following is an extract from a paper read before the Trinidad Agricultural Society by Mr. C. W. Meaden, Manager of the Government Stock Farm :—

I beg to submit to the society a sample of molascuit manufactured at the Usine St. Madeline.

Professor Carmody's analysis of a similar sample points it out to be a useful addition to any food for most stock; and those who are accustomed to use molasses in small quantities for dairy cattle will find this molascuit much more convenient and cleanly than ordinary molasses, and as far as can be judged, the new product is more economical and of superior food value.

If kept dry, molascuit will remain for a long time without losing its quality, flavour, or aroma. As a local product of considerable value as a stock food its use should be encouraged. It has been used at the Government Farm since its appearance on the market. The milch cows relish it in their other food given as a drink, and its use has diminished the cost of feeding without influencing the quality of the milk.

It has also been added to the feed of young growing animals who get chopped fodder, such as corn, Guinea and Para grass. The molascuit with cocoa-nut meal is mixed through the 'chop-chop' early in the day, well stirred and given in the afternoon. These young animals graze out during the day, are stalled at night, given feed as above and Guinea grass. Their gain in weight last month averaged 56 lb., valued at $2·24; cost of feeding, $1·20 to $1·50.

Molascuit has become famous with dairymen in Canada. From the market quotations there the value of the article is well demonstrated, and no doubt, when fully known here, its value will be equally well recognized.

Professor Carmody's report on two samples is as follows :—

The difference in value of the ingredients used for each of these samples is slight.

Sample No. 1 has a better aroma and contains 8 per cent. more glucose and about 4 per cent. less woody fibre than No. 2.

	No. 1.	No. 2.
Sucrose	28·40	29·00
Glucose	19·60	11·95
Woody fibre ...	4·70	8·48

Molasses and Cotton Seed Meal for Stock.

Farm and Home has the following note on the use of molasses and cotton seed meal for stock :—

I began to use a mixed feed containing a liberal amount of molasses. After the cows had been on this feed for twelve days the milk yield had increased one-half, and at the end of three weeks it had doubled. This feed is made up of 45 lb. of ground corn and oats equal parts, 22½ lb. cotton seed meal, 22½ lb. dried brewers' grains and 100 lb. molasses, a cheap, low-grade stuff commonly known here as 'black jack.' Of this mixture I feed from 8 to 10 lb. per day, depending on weight of the animal and milk she is giving. Aside from its high food value, the molasses are useful also in their mechanical action upon the other foods in the mixture, since they act as a leaven to the whole, making the otherwise heavy grains into a slightly moist, spongy mass. Tightly squeezed into the hand and then released, it slowly opens out, breaks up and falls apart lightly and fluffy, which condition considerably aids digestion. By measure this feed is lighter than bran, has a higher food value, is more digestible, as well as palatable, to all stock, and is cheaper by from $1 to $3 per ton. As a horse feed I secured better results from this mixture than from the standard grains. Horses and mules fed on it soon took on a sleek, bright, glossy coat and gained in weight, general health, and appearance from the first week, doing the same work as before. I feed from 8 to 12 lb. a day, according to weight of animal, kind, and amount of work done. Those of my neighbours who have followed my directions in using this mixture are very enthusiastic over it.

CONSUMPTION OF CACAO IN THE UNITED KINGDOM.

Reviewing the report of the Commissioner of Customs for the year 1903-4, the *Chamber of Commerce Journal* has the following reference to the consumption of cacao in the United Kingdom :—

With few exceptions each of the last forty years has shown a substantial increase in the consumption of cacao, the average annual rate of increase in the quantity of raw and prepared cacao retained for consumption being about 2,400,000 lb., but between 1900-3 the decreases were swelled owing to the demand for the South African war. Foreign manufactured cacao continues in greater demand, the increase in the quantity retained for consumption in 1903-4 having been 1,939,478 lb. The clearances for the last two years were as follows :—

	1902-3.	1903-4.
Cacao, raw, ...	37,181,180 lb.	44,204,760 lb.
Cacao, husks and shells,	1,989 cwt.	3,732 cwt.
Cacao, prepared, ...	8,363,755 lb.	10,303,233 lb.
Cacao butter	239,362 lb.	119,501 lb.

WEST INDIAN FRUIT.

BANANA SHIPMENTS FROM BRITISH GUIANA.

In connexion with the efforts that are being made in British Guiana to establish a trade in bananas with the United Kingdom, the following circular has been issued. It will be noticed that the system of paying for bananas by weight is being introduced :—

The bananas to be quite green, and not quite 'full' and of the 'Cavendish' variety only (locally known as 'Dwarf' or 'Chinese'). No others will be accepted.

The bunches, which will be paid for as below, must be delivered in good condition at Messrs. Garnett & Co.'s wharf on the day preceding the departure of the mail steamer or on the day itself by special arrangement, or may be delivered, if coming by train, at the Railway Co.'s wharf on the day preceding the departure of the mail.

Per bunch of		Per bunch of	
6 hands,	20 to 30 lb. 12c.	50 to 60 lb.	32c.
7 hands,	30 to 40 ,, 20c.	60 to 70 ,,	40c.
	40 to 50 ,, 24c.	80 lb. and over	48c.

No bunches weighing under 20 lb. will be taken.

BANANA FERTILIZER.

The following is a certificate of analysis, by Professor d'Albuquerque, of a banana fertilizer used in the Canary Islands :—

Moisture — — — —	6·00
Ammonium sulphate * — — —	11·91
Organic matter † — — — —	16·19
Insoluble siliceous matter — —	2·80
Monocalcium phosphate — — —	9·12
= tricalcium phosphate rendered soluble in water ‡ — — —	12·08
Phosphates soluble in ammonium citrate ‡	4·00
Insoluble phosphates — — —	·98
Calcium sulphate, Alkaline salts, Magnesia, etc. † † —	49·00
	100·00

* Containing nitrogen	2·53	= ammonia	3·08
† ,, ,,	·67	= ,,	·81
† † ,, ,, (nitric)	—	,,	—
Total nitrogen	3·20	= ammonia	3·89
‡ Assimilable phosphates	—	—	16·08
† † Containing potash	—	—	4·74
= sulphate of potash	—	—	8·77

TRINIDAD FRUIT FOR THE LONDON EXHIBITION.

The *Port-of-Spain Gazette* of November 18 contains the following account of the shipment of a large exhibit of Trinidad fruit for the Royal Horticultural Society's Exhibition of Colonial-grown Fruit to be held in London on December 13 and 14 :—

The Royal Mail Company having decided on their own account to accept the offer to send a show of Trinidad fruits and vegetable produce to the Exhibition of the Horticultural Society, Mr. W. W. Symington, Managing Director of the Symington West Indian Fruit Company, was by them commissioned to collect and prepare the exhibit for shipment; and yesterday, at the Fruit Company's packing sheds, the fine collection was arranged as a very attractive show, which won deserved admiration from the visitors invited to see it. The fruit was shown packed and half packed (to illustrate the process) in neat wooden and bamboo boxes and baskets; or packed in a preservative liquid in wide-mouthed, clear-glass bottles; and included oranges, limes, tangerines, grape-fruit, shaddocks, ground nuts, bananas, ockros, papaws, sapodillas, sugar-canes, pine-apples, green cocoa-nuts, peppers, melongene, green and white christophines, nutmegs in shells and mace, cherries, cassava, sweet potatos, yams, avocado pears, granadillas, pumpkins, etc., as well as a small assortment of locally made preserves, hot pickles of various kinds, roasted cashew nuts, and several kinds of jams from local fruits. The whole goes to Southampton by to-day's Royal Mail in the cool storage, and will there be kept until the day of the show. It certainly forms a very comprehensive sample, especially considering the season of the year, of what Trinidad can produce; and both Mr. Skinner of the Royal Mail Company by whom it has been organized, and Mr. Symington, on whom has fallen the labour of its collection and preparation, are deserving of much credit for the advertisement it is bound to afford the colony.

Lucky Beans. It may be of interest to mention that the 'Lucky Beans' or 'Good Luck seeds,' so commonly employed in the West Indies as pendants, are borne by a plant known as *Thevetia nereifolia*, belonging to the natural order *Apocyneae*. It is a pretty ornamental shrub, with large saffron-coloured flowers, frequently grown in gardens. The fruits, which are supposed to be poisonous, contain a hard, two-celled seed. The milky juice of this plant is a dangerous poison.

COTTON INDUSTRY.

British Guiana.

In regard to cotton experiments in British Guiana, the following statement has been published by Professor J. B. Harrison, Chairman of the Board of Agriculture:—

Up to the present the following points may be regarded as being fairly settled:—

(1) Sea Island cotton does not grow luxuriantly on the heavy clay lands of the sea-board of the colony. Under favourable conditions of drainage, cultivation and rainfall, it may there produce small crops of cotton of good quality.

(2) Sea Island cotton will grow luxuriantly on the lighter sandy loams of the front lands of the colony. It will there produce fairly satisfactory crops of cotton of excellent quality.

(3) On certain heavy clay soils Egyptian cotton grows fairly well, and under suitable conditions of cultivation and manuring may grow luxuriantly. Its yield is a cotton of good value.

(4) Upland cottons do not appear to thrive on the coast lands of the colony.

(5) Several of the so-called native or creole varieties grow vigorously on the coast lands, both on the heavier and on the lighter soils, and promise to give fairly heavy crops of medium-staple to short-staple cotton.

(6) At present there is nothing reliable before the Board to indicate the cost of cleaning, planting with cotton, and cultivating an acre of land under commercial conditions, but owing to the higher cost of labour in British Guiana, this will probably be in excess of the cost in the West India Islands. As a set-off against this, we have former experience which showed, that with varieties of cotton suited to the soil and climatic conditions, exceptionally high yields per acre were obtained in British Guiana.

Barbados.

In an account of an interview given to the Washington correspondent of the *Louisiana Planter* by the Hon. D. F. Wilber, United States Consul at Barbados, the following remarks are made on the cultivation of cotton at Barbados:—

Consul Wilber says that two years ago the Imperial Agricultural Department put 16 acres in Sea Island cotton and sold its product in Liverpool for 27c. per ℔. This, with the promise of several planters to set aside some portion of their estates for cotton cultivation induced the British Cotton-growing Association to furnish an up-to date cotton gin and erect a suitable building at Bridgetown in which to gin and pack the cotton produced on the island. Last year about 1,200 acres were planted in cotton and the crop harvested was sold in Liverpool at an average of 32c. per ℔. There has been a larger acreage this year devoted to cotton, seed from South Carolina being used exclusively. This seed was procured by the Agricultural Department and sold to the planters at cost price.

Mr. Wilber says that the cheap labour of Barbados, coupled with the fine quality of cotton raised there, is bound in time to induce capital to enter the island for the establishment of cotton factories and textile mills. The quality of the cotton renders it highly suitable for the manufacture of laces and fine lawns, and such goods are much less bulky freight for export.

Acreage in Cotton in the West Indies

The following is an approximate return of areas planted in cotton in the West Indies during the season 1904-5. The returns for Jamaica are provisional and liable to revision, while no returns have yet been received from British Guiana. Further information will be duly recorded:—

SEA ISLAND COTTON.

	Acreage.
Barbados	1,600
Leeward Islands:—	
Antigua and Barbuda ...	530
Montserrat	600
St. Kitt's-Nevis	2,350
Virgin Islands	50
Windward Islands:—	
St. Vincent	1,471
St. Lucia	150
Grenada and dependencies ...	32
Trinidad and Tobago	150
Jamaica and dependencies ...	310
British Guiana	—
Total Sea Island cotton	7,243

MARIE GALANTE AND OTHER VARIETIES OF COTTON.

Grenada and dependencies ...	4,088
St. Vincent	250
Other colonies	100
Total other varieties of cotton	4,438
Grand Total	11,681

Porto Rico.

In the annual report of the Porto Rico Agricultural Experiment Station for 1903, Mr. F. W. Gardner, Special Agent-in-charge, makes the following observations on cotton:—

No systematic experiments have been undertaken with cotton, for the reason that considerable experimenting has been undertaken by persons who have recently organized the Walker Industrial Cotton Company. Their experiments extended to all parts of the island and to planting of different sorts every month through the year. They report about 8,000 acres planted during the present season, of which a large percentage promised a good crop. They recommend the Sea Island variety as best for planting and the month of May as a preferable time.

Then follows the extract published in the *Agricultural News* (Vol. III, p. 37) from *The Times* of December 21, 1903.

In another place in this report, Mr. F. S. Earle, formerly of the New York Botanical Garden, now in charge of the Agricultural Department of Cuba, reports as follows:—

Cotton culture is beginning to attract some attention in Porto Rico. I saw no fields of cotton, but scattered plants of the perennial *Gossypium barbadense* were not uncommon along the roadsides. These thrive so well under conditions of absolute neglect that there can be no doubt as to the success of this crop when properly cultivated. Two leaf diseases were noticed, viz., the true cotton rust (*Uredo gossypii*) and the well-known disease of the Southern States, the cotton areolate mildew, caused by *Ramularia areola*.

ARBOR DAY.

Antigua.

The following is a letter received from the Hon. Francis Watts in regard to Arbor Day celebrations at Antigua :—

I have pleasure in informing you that Arbor Day was celebrated in Antigua most successfully on November 9, not only in St. John's, but in all the parishes in the island.

The programme for St. John's was as follows :—

(1) The planting of a group of palms by his Excellency the Governor, Lady Knollys, Miss Knollys and Mr. H. L. Knollys opposite the east entrance to Government House.

Before planting the trees his Excellency gave a brief address.

(2) The planting of thirty-two mahogany trees on the north and east sides of the Cricket Ground, by young ladies.

(3) Planting of twenty mahogany trees, to double the avenue along part of the road through the Victoria Park, by children of the Moravian and Wesleyan schools.

(4) The planting of mahogany trees round the new Anglican school, by the school children.

(5) The planting of avenues of mahogany and palm trees in the grounds of Buxton Grove by the students of the Training College and pupils of the school.

(6) The planting of rows of palm trees in Redcliffe Street and Tanner Street by the pupils of the Girls' High School.

(7) The planting of rows of palm trees in Redcliffe Street and St. Mary's Street by boys of the Grammar School.

Considerable public interest was taken in the ceremonies which now appear to have become recognized institutions.

Dominica.

The following report on Arbor Day celebrations in Dominica has been forwarded by Mr. A. J. Brooks, Acting Curator of the Botanic Station :—

I am pleased to be able to inform you that Arbor Day was successfully celebrated in Dominica on the King's birthday. Owing to the existence of such a large number of trees in the island, it was decided that only ornamental trees and palms should be planted.

The movement was purely of an educational character, the object being to foster a love of plants among the children. For this purpose the boys and girls of the Roseau School met at the schoolroom and songs and speeches suitable to the occasion were given, after which the children marched to the Savannah where the planting of palms was to take place. Twenty-two palms were planted. The planting having been completed, the proceedings terminated with the singing of the National Anthem.

The boys of the Agricultural School took part in the movement by planting a row of ornamental trees along the edge of the Morne, the trees used being *Cassia Fistula* and the Flamboyant which in time to come should give a beautifying effect to the town. The Arbor Day movement is also to be celebrated by all the schools in the country districts, but as November 9 proved to be inconvenient, the Queen's birthday is to be recognized as a day set aside for tree planting in these districts.

Each tree planted is protected by guards consisting of three square posts around which is fastened wire netting to prevent fowls and cattle from causing damage. The plants used were raised at the station, and every assistance was rendered by the local officers of the Department.

St. Kitt's.

The St. Kitt's *Advertiser* of November 15 has the following account of the celebrations at St. Kitt's :—

Arbor Day was celebrated in this island on the King's birthday. The day was celebrated in this island and over in Nevis with some enthusiasm. The Botanic Station here wore quite a festive appearance under the decoration of flags tastefully arranged along the central walk, and a large number of trees was planted within its grounds. The ceremony was formally opened by the Administrator, who addressed an assemblage of over a thousand persons including the children of the various schools in town. He pointed out the objects for which they were invited to meet together and expressed the hope that not only should trees be regarded by all present as the natural ornament of the land in which they live, but that each should cultivate a love for them and protect rather than injure or destroy them as has been a common practice.

At the conclusion of his remarks three cheers for His Majesty King Edward VII were raised and the planting operations were then carried out, commencing with the Administrator and simultaneously followed by members of the Executive and Legislative Councils, members of the Basseterre Town Board, members of the Mutual Improvement Society, and six pupils each from the Grammar School, Catholic, Anglican, Wesleyan and Moravian schools.

After the ceremony at the Botanic Station a large part of the assemblage repaired to the grounds of the Wesleyan School, where upwards of thirty trees were planted

Nevis.

We are indebted to the Hon. C. A. Shand for the following account of Arbor Day celebrations at Nevis:—

Arbor Day was celebrated here with great éclat. From 700 to 800 school children mustered on the Savannah from all quarters at 1.30. Arrived at the rendezvous, the children were permitted to rest for a short time and then refreshments were distributed. At 3 p.m. the children fell in and with bands playing set out for the new cemetery which has recently been enclosed by the Government and which had been selected for the site of the tree planting. The National Anthem was sung, and at its conclusion each appointed child decorously proceeded to plant the tree assigned to it. The Inspection Committee passed from tree to tree to ascertain if the planting had been properly carried out.

Virgin Islands.

Mr. W. Fishlock, Agricultural Instructor in the Virgin Islands, has forwarded the following note on Arbor Day celebrations at Tortola :—

Arbor Day was observed in Tortola, Virgin Islands, on November 9, the King's birthday. The children of the Anglican School assembled at 10 o'clock, and after short explanatory addresses by the Rev. H. L. Monckton and the Agricultural Instructor, proceeded to the residence of the Commissioner, where sweet orange, date, and rubber trees were planted. They also planted saman trees in the market place.

The Wesleyan scholars assembled later, and marched to the Commissioner's residence, here they sang the National Anthem, and planted mammy, sapodilla, and pear trees. Later they planted galba trees on the roadside near the station. Bonfires were lighted at Kingston in the evening

COTTON EXPERTS IN THE WEST INDIES.

As already mentioned in these pages, the visit of the Cotton Experts sent out by the British Cotton-growing Association has been greatly appreciated in these colonies.

The arrangements for the meetings of the cotton growers in the islands where cotton was being grown on a moderately large scale were entirely successful. The only drawback was the limited time that had been fixed, beforehand, for the stay of the experts in the West Indies.

There can be no doubt as to the results that must follow the sound practical advice given by Mr. Oliver as to picking and preparing cotton for shipment.

As likely to be of further service in this direction, we quote the following extracts from an interview with Mr. Oliver published in the Barbados *Advocate* of November 19 last:—

The advent of the two English cotton-spinning experts, Messrs. E. Lomas Oliver and Richard Stancliffe, who have been sent to the West Indies by the British Cotton-growing Association to enlighten cotton growers in these colonies as to the kind of cotton they should endeavour to produce, and as to how they should treat it before shipment, has given a great impetus to the new industry in these islands. The information and advice, which these gentlemen have endeavoured to disseminate far and wide throughout the islands by the means placed at their disposal by Sir Daniel Morris, have been seriously taken to heart by everyone who is either already engaged or intends to engage in cotton cultivation, and if the present crop turns out as it is expected, the area of cultivation will probably be very considerably increased during the next season. There is no denying the fact that for the short time the industry has been started in these islands phenomenal progress has been made, both in cultivation and in the quality of the fibre. In several instances the cotton produced has been second to none. It has held a high place in the English market and is creating for West Indian cotton a reputation which can be maintained only by unremitting effort, careful cultivation, and the selection of the best seed for propagation. These points are quite manifest to those who take an interest in the industry, and have been fully confirmed by the cotton-spinning experts in their public utterances and emphasized in a brief interview which a reporter of the *Advocate* had with Mr. Oliver on the afternoon of Saturday last.

'Since leaving Barbados we have visited St. Lucia, Dominica, Montserrat, Antigua, St. Kitt's, and Nevis, all within one week, spending from daylight to dark at each island, and holding meetings, which were well attended. We afterwards visited St. Vincent. The people in these islands, I think, take a very keen interest in cotton growing. They listened most attentively to all that was said, and I think they are in earnest in the matter.

'St. Vincent promises to be one of the largest cotton-growing areas in the West Indies. The island is well suited to the cultivation of cotton, and circumstances seem to render it probable that cotton will be cultivated there on a large and successful scale. I may say I saw a good deal of that island. During our travels we examined some excellent samples grown from Rivers seed. It is quite clear from the samples shown me that the climatic conditions and the soils of the West Indies are eminently suited to the cultivation of first-class cotton. The general condition of the crop is excellent; and I hope it will be brought to market in a better condition this season than it was last season. Of course, the planters now understand the importance of not picking the cotton until it is thoroughly ripe, and of not mixing the stained with the perfect cotton. They also now fully understand that cotton must be picked free from leaf, chips and other trash, because when passing through the gin these get broken up into small particles and damage the appearance of the cotton in the eyes of the spinner.

'The area of cultivation could be much increased with safety, and our chances as cotton producers are, I think, first rate. The West Indies seem to me to have a great advantage over the Sea Islands of South Carolina, because they have nothing to fear from frost. On the other hand, the proportion of stained cotton appears to be larger than it is in the Sea Islands. The question which will eventually decide the fate of these islands as cotton-producing areas will be: Which can grow it the cheaper; the West Indies or the Sea Islands? If labour can be obtained cheaper here than in the Sea Islands, the West Indies have nothing to fear from competition with cotton grown in those islands, because from what I have seen you can grow as good cotton as can be grown anywhere, *if the planters will only take the trouble to do so.* That they will take the trouble I have no reason to doubt; and I am convinced that they are all capable men, for they have made wonderful progress during the comparatively short time that the industry has been started.

'All the crops that I have had the privilege of inspecting were, on the whole, free from disease; and where disease has appeared the officers of the Imperial Department have assisted the planters so promptly with advice as to remedies that the disease has invariably been overtaken before it had been able to make any serious inroad upon the crop. I think, if the planters will follow the advice given by the Department's officers, and will themselves exercise due care, they will be acting on perfectly safe lines.'

BRITISH COTTON-GROWING ASSOCIATION AND THE IMPERIAL DEPARTMENT OF AGRICULTURE.

The following letter, dated October 15, 1904, has been received by the Imperial Commissioner of Agriculture from the Colonial Office:—

I am directed by Mr. Secretary Lyttelton to acknowledge the receipt of your letter of the 6th. instant, enclosing a copy of a letter from the Vice-Chairman of the British Cotton-growing Association conveying the thanks of the Association to the Officers of the Imperial Department of Agriculture for the assistance rendered by them in connexion with the development of the cotton industry in the West Indies.

Mr. Lyttelton is very sensible of the valuable services rendered by you and your Department in promoting the cotton industry of the West Indies, and he has observed with pleasure the appreciatory resolution which has been passed on the subject by the British Cotton-growing Association.

I am to add that Mr. Lyttelton notes with much satisfaction the action of the Association in sending out two of their leading members to the West Indies with a view to establishing agencies for the purposes mentioned in your letter, and he trusts that their visit may be productive of the best results.

(Sgd.) H. Bertram Cox.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 399 of this issue.

The *Agricultural News:* Price 1*d.* per number, post free 1½*d.* Annual subscription payable to Agents 2*s.* 2*d.* Post free, 3*s.* 3*d.*

Agricultural News

Vol. III. SATURDAY, DECEMBER 3, 1904. No. 69.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with the visit of the Deputation from the British Cotton-growing Association. On p. 391 there is published a summary of an article on the same subject which appeared in the Barbados *Advocate.*

Various notes of interest to sugar planters will be found on pp. 386-7. These deal with the industry in Jamaica and Hawaii and with the use of molasses for feeding purposes.

In connexion with the cotton industry there are published on p. 389 notes in regard to cotton experiments in British Guiana and a table showing approximate returns of areas planted in cotton in the West Indies during the present season.

Arbor Day was celebrated on the King's birthday at Antigua, Dominica, St. Kitt's, Nevis, and Tortola. (p. 390.)

On p. 394 will be found notes on an orange pest of the West Indies and the cotton leaf-blister mite.

A short account of seeds used in the West Indies for ornamental purposes is published on p. 395.

Mr. J. Russell Murray's monthly report on West Indian produce in the Canadian markets will be found on p. 397; on the same page is an interesting note on the banana trade in Canada.

Agricultural Shows.

Arrangements are already being made by local committees for holding agricultural shows in several of the West India Islands.

In the Northern Islands shows are to be held in February next in Antigua, Dominica, Montserrat, and Nevis.

The annual local exhibition for peasant proprietors, that was to have been held at Dunscomb plantation on January 10, has been postponed till January 24, on account of the West Indian Agricultural Conference.

It is proposed to hold a show in St. Vincent in March next. The Imperial Commissioner of Agriculture will probably be present at all these shows.

Tobacco Culture in the Canaries.

The United States Consul at Teneriffe reports that the Spanish Government is offering encouragement to the growers of tobacco in the Canary Islands, with a view to making Spain, at some future date, independent of Cuba in regard to certain qualities of tobacco now bought there.

At present the crop amounts to 132,000 lb. In the island of Las Palmas, where nearly all the tobacco is grown, 20 per cent. of the male population has been, at one time or another, on Cuban plantations. It is reported that the Canary tobacco is much better in quality than the 'Remedios' of Cuba, and a large increase in the output is expected. For the year 1904 it will reduce the export of 'Remedios' tobacco from Cuba to Spain about 1,600 to 2,000 bales.

Jamaica Tobacco Industry.

In view of the efforts that are being made to improve the position of the Jamaica tobacco industry, the following brief historical note is likely to be of interest:—

In 1872 a Government prize of £250 was awarded to two gentlemen, each of whom produced over 8 acres of tobacco of a superior description. The export of tobacco appears to date from the following year when 896 lb. of leaf of the value of about £100 were shipped. In the next year the value of the exports rose to £1,072. In nine years they had reached the value of £16,412. After this the exports fell considerably, and it was not till the year 1897-8 that this figure was again reached. In 1900-1 the highest figure was reached, viz., £22,679.

In his annual report for 1880, the Director of Public Plantations stated: 'The Cubans seem quite convinced that Jamaica tobacco is equal in every respect to the best Havana produce: and there are satisfactory evidences that higher methods of culture, and more systematic and careful systems of manufacture are being inaugurated, which must result in giving greater permanence and value to this promising industry.'

At that time it was reported that the majority of the workmen employed in the industry were Cubans, but that the natives were gradually taking part in it.

Exports and Agriculture of Barbados.

According to the *Colonial Report* on Barbados for 1903-4, the exports of the island were valued at £552,891, being £39,574 less than in the previous year: this decline was mainly due to the small yield of the sugar crop. The principal articles of export, in addition to sugar and molasses, were: fruit and vegetables, £7,099; manjak, £6,508; tamarinds, £866; and hides, £569. Building lime, living animals, and aerated waters were also responsible for considerable additions to the total value of the exports.

The report refers to the measures taken by the Imperial Department of Agriculture to promote agricultural education and to carry on the experiments for improving the cultivation of the sugar-cane. 'Active measures were taken by the Department with the co-operation of the Colonial Government, to promote the introduction of the cotton industry and to establish a trade in bananas with the United Kingdom. . . . Another industry which has been fostered by the Department of Agriculture is the curing for export of flying fish, albacore, and the various other fish that abound in these waters.'

It is reported that the colony appears to be recovering from the depression resulting from its recent reverses.

Trade and Agriculture in the Bahamas.

The *Colonial Report* on the Bahamas for 1902-3 states that more than half the value of the exports is ascribed to sponge, which is by far the most valuable product of the colony. The exports of fruit have fallen to a very low figure, and those of fibre have remained stationary.

The principal exports were as follows: sponge, £113,337; sisal fibre, £38,805; pine-apples, £24,471; canned pine-apples, £7,582; turtle shell, £8,630; and citrus fruits, £2,914.

The serious decline in the value of the exports of pine-apples is attributed to the import duty in the United States; it would appear, however, that there are prospects of a largely increased business being done in canned pine-apples, one factory, it is reported, expecting to export 50,000 cases this year. The canning of tomatos has also been taken up with fair prospects of success.

The sisal industry continues firmly established. The ease with which the fibre can be cleaned by hand has made it a most valuable resource for small landowners.

As already briefly announced in the *Agricultural News*, an Agricultural Board has recently been constituted by the Legislature and a small appropriation has been placed at its disposal for the establishment of a Botanic Station and the employment of a Curator. In this way it is hoped to spread a knowledge of what crops can be grown most profitably in the various soils of the islands; it is also hoped to benefit the people by inducing them to settle on the land and grow minor products of economic value besides corn and root crops for their own consumption.

Forestry in West Africa.

At a recent meeting of the African Section of the Liverpool Chamber of Commerce an address was given by Mr. H. N. Thompson, Conservator of the Forestry Department of Southern Nigeria, on 'Forestry in West Africa.'

Mr. Thompson stated that the Indian system of forest organization had been applied to the new department in Southern Nigeria. It was necessary that the various districts should be thoroughly explored, that a knowledge of the forest products should be obtained, and that a general working plan of forest control should be formulated.

The system aimed at preserving the climatic influences of the locality concerned, maintaining its reproductive capacity, and securing an uninterrupted supply of timber. To effect the last object, the forest must be a complete series of trees from the seedlings to the matured trees. The most valuable of West Africa's minor forest products was rubber; native rubber plantations, under a native subordinate staff, receiving its training from the staff of the Forestry Department, had proved a great success.

Cotton Seed as a Manure.

It has been suggested that the presence of the oil in cotton seed (whole or crushed) when used as a manure, not only causes the seed to be inferior to cotton seed meal (i.e. the residue after the extraction of the oil), but also actually acts deleteriously towards plant growth.

In regard to the first point, experiments appear to have proved conclusively that both cotton seed (whole or crushed) and cotton seed meal are satisfactory manures for supplying nitrogen to cotton; that as between the two there is a *slight* difference in favour of the latter; and that whole cotton seed is as efficacious as ground cotton seed. Any slight superiority possessed by the meal is probably due to its containing plant food in a rather more available form; the effect of this is not as a rule noticeable in the case of, say, cotton and corn, but is apparent when cotton seed is applied to a crop, like Irish potatos, that occupy the land for a shorter time.

With regard to the deleterious action of cotton seed, or rather, of the oil contained in the seed, this is noticed only when large piles of seed are allowed to stand for some time on the ground; the spots covered in this way remain bare afterwards, as if they had been poisoned. No such effects result from the ordinary use of the seed in quantities of, say, 12 to 20 bushels to the acre. When whole cotton seed was used for manurial purposes in the United States, it was found necessary to put the seeds out in the winter, otherwise they were likely to sprout. For similar reasons, it will probably be found more expedient in the West Indies to crush the seed before applying it.

It may be well to point out that the term 'cotton seed meal' is usually taken to signify the residue after the expression of the oil. The use of this term, therefore, for crushed seed is contrary to the usual practice.

INSECT NOTES.

An Orange Pest in Porto Rico.

The Annual Report of the Porto Rico Experiment Station contains notes on insect pests by the Entomologist, Mr. O. W. Barrett, among which are to be found references to several pests known in the British West Indies. The following paragraph is taken from this report :—

'The larva of a weevil determined as *Exophthalmus spengleri* was found eating the bark from the tap-roots of orange stock in a nursery near Rio Piedras. The adult insect is common throughout the island not only on citrus stock, but on nearly all kinds of fruit trees. A handful of air-slaked lime at the foot of the tree deters the female from entering the ground to deposit her eggs at that point. Hand picking will probably be found necessary to keep this pest in check for the next few years.'

Specimens of the golden weevil of St. Vincent, which has been determined as *Diaprepes spengleri*, were sent from the head office of the Imperial Department of Agriculture to Mr. Barrett, who has compared them with specimens of *Exophthalmus spengleri* and concludes that they are the same. This insect was mentioned in the *Agricultural News* (Vol. II, p. 280, and Vol. III, p. 202). The fact that this is now known to be a serious pest to citrus plants lends interest to the following description of methods used to capture the adult weevils :—

A large sheet of oil-cloth is attached on two sides to poles which serve as handles. From one of the remaining sides a slit is made to the centre, and this sheet is held under the orange or other tree, the trunk or stem of the tree standing in the slit. The tree is then jarred or gently shaken, whereupon the weevils fall down and are caught in the oil cloth. They are then brushed off into a bucket containing kerosene oil and water. This method may be found useful for other insects which have the habit of folding their legs and feigning death when disturbed.

Cotton Leaf-blister Mite.

During his recent visit to St. Vincent, the Entomologist on the staff of the Imperial Department of Agriculture devoted considerable attention to the cotton leaf-blister mite. The following extracts from his official report are of interest as showing what is being done to suppress this pest :—

The cotton leaf-blister mite (*Eriophyes gossypii*) is quite generally distributed over St. Vincent in all situations where cotton is being grown, although many fields are not yet attacked, and there are but few cases where the attack is severe.

The early-planted cotton has suffered more this year from the leaf-blister mite than has that planted later ; only one field of July-planted cotton attacked by the leaf-blister mite came to my notice, while several planted in June and earlier were attacked. No infestation was found in fields planted later than June, with the one exception already mentioned. On one estate about 6 acres were very seriously attacked.

It has not been possible, as yet, to discover the source of infection at several places, for although wild cotton may be found growing in every locality, there is but little of it, and the first attacks have been well to leeward of fields in which careful search has not revealed any infection of the cultivated cotton to windward of these spots.

On several estates many affected plants have been pulled out, and affected leaves and branches have been taken off and taken out of the field and burned. On one estate this affected material was thrown into the sea. The application of lime and sulphur had been begun in a few places, but on account of the frequent heavy showers had been given up.

By the experiments conducted in Montserrat with a number of insecticides sulphur was shown to be the best, and its application as a dust, with equal parts of lime, seemed the most practical method to be used. Extensive experiments will now be tried at Rutland Vale and other places in St. Vincent for the sake of testing this insecticide under varying conditions and proving whether plants and fields already badly attacked can be saved, how much must be used, how often applications need to be made, and how much influence the abundant rainfall has in washing off the sulphur from the plants.

Until further experimental work has been done and results achieved, the following seem to be the only recommendations to make :—

(*a.*) Clean cultivation. All weeds and bush should be kept down by frequent weedings, and in all fields of young cotton the plants should be singled out and only one left in each hole. Any cotton not more than 18 inches high might be singled.

(*b.*) Destruction of badly infested material. Very badly infested plants, or parts of plants, should be removed from the field and burned.

(*c.*) Applications of lime and sulphur. Lime and sulphur, in equal parts, should be dusted on the plants at intervals of about two weeks. A coarse cloth bag of Osnaburg will serve this purpose as recommended for use with Paris green in combating the cotton worm. Great care should be taken to get the sulphur dust well inside the plant so that it will come in contact with all the branches and leaf stalks, as well as with the leaves.

(*d.*) Destruction of wild cotton. All wild cotton growing near cultivations of Sea Island cotton should be cut and burned.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, accompanied by the members of the Deputation from the British Cotton-growing Association and the Entomologist on the staff of the Imperial Department of Agriculture, returned to Barbados from St. Vincent in R.M.S. 'Esk' on Saturday, November 19.

The Imperial Commissioner of Agriculture left Barbados in S. S. 'Oruro' on Friday, November 25, for Trinidad for the purpose of consulting as to the arrangements for holding the next West Indian Agricultural Conference. During his visit Sir Daniel Morris had interviews with leading members of the Agricultural Society and others who are evincing a keen interest in the prospects of the Conference. Sir Daniel Morris returned to Barbados in S.S. 'Caprera' on Tuesday last.

ORNAMENTAL SEEDS.

At a meeting of the Barbados Natural History Society held on November 10, a paper was read by Mr. W. R. Buttenshaw, M.A., B.Sc., on 'A West Indian Curiosity Shop, from a botanical point of view.' Mr. Buttenshaw's account of ornamental seeds is reproduced here as it is likely to be of interest to readers of the *Agricultural News*:—

Among the wares of the West Indian curio shop a prominent place is always occupied by the rosaries, necklaces, bracelets, and other ornaments made with seeds. There is in the West Indies a fairly large number of pretty and striking seeds suitable for this purpose. The following list includes, I think, most of the seeds employed in this way. From a botanical point of view it is an interesting point to observe that the majority of the plants yielding seeds of this kind belong to the natural order *Leguminosae*. We will deal with these first:—

Abrus precatorius. The seeds, known as 'Crab's Eyes,' are used for making necklaces, rosaries, etc., in fact, the specific name 'precatorius' shows at once the connexion with 'praying.' In India they are used by goldsmiths as weights. These well-known scarlet seeds with their black eyes need no description.

Adenanthera pavonia. Circassian seed tree. In Porto Rico it is known as 'Coral plant,' since the seeds can be used in making scarf pins, etc., in the place of coral. It is also commonly used in making necklaces, etc. The seeds are of a uniformly bright, scarlet colour, *devoid of markings*, somewhat lens-shaped, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter, are particularly uniform in size and weight, and on account of this latter characteristic are, like 'Crab's Eyes,' used in India as weights.

Albizzia Lebbek. The Woman's Tongue tree, or, as it is known here, Barbados Ebony. These seeds are not in such common use as those already mentioned for ornamental work, although they are among those used in Barbados for necklaces, etc. They are of a pale-brown colour, and are flat.

Caesalpinia Bonducella. This is the Horse Nicker tree—bearing the grey nickers—common along our coasts and therefore well known to you all. The seeds are used for making rosaries, necklaces, etc. These are rather large seeds—from $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter—and of a dull lead colour.

Caesalpinia Bonduc is the name of the tree that bears the yellow nicker seeds. The specific names of these two plants are derived from the Arabic *Bondoq*, signifying a necklace.

Crotolaria retrusa. Rattle bush (yellow). Used for making necklaces, chains, etc.

Erythrina Corallodendron. Variously named the 'Red bean tree,' 'Coral tree,' 'Coral bean tree,' 'Bead tree,' etc. The last name in allusion to its seeds being strung as beads in chaplets. The seeds are scarlet with a little black spot.

Leucaena glauca. The seeds of this tree, known as 'Wild Tamarind,' are used for fancy work in several of the islands, notably, for baskets, work-bags, etc. In Barbados they are called 'Mimosa seeds.' In appearance they are flat and dark-brown, with a shining surface.

Ormosia dasycarpa. This tree bears the true 'Jumbee' or 'John Crow' beads. It is also known as the 'West Indian Bead tree' or 'Necklace tree.' The seeds are somewhat varied in size, round and flattened, mostly scarlet with a black blotch at one end. The generic name is derived from the Greek work *Ormos*, a necklace. Not only are the seeds threaded into bracelets and necklaces, but are mounted in gold or silver for studs and buttons.

Pithecolobium Unguis-cati. 'Bread and Cheese.' Black, shiny seeds with rosy arillus, used for necklaces and bracelets.

Of non-leguminous seeds the following are used:—

Anacardium occidentale. Cashew. The kidney-shaped nut is frequently mounted for pendants.

Canna indica. Indian shot. I have not come across these seeds in any West Indian curiosity shop, but in India and East Africa they are used as beads and made into necklaces.

Coix Lachryma-Jobi. Job's tears. These are used for all sorts of ornamental purposes—not only for necklaces, bracelets, girdles, etc., but also for trimming ladies' dresses, etc. Mats are also frequently made of Job's tears.

Sapindus Saponaria. Soap-berry plant. These round black seeds were formerly exported to England for use as waistcoat buttons; they are now often strung as beads. The watery juice yielded by these seeds makes a lather with water and therefore serves all the purposes of soap, but is liable to injure clothes. Used for rosaries in the West Indies.

Thevetia nereifolia. This is an important plant from the curio dealer's point of view, as it yields the well-known 'Lucky seeds,' or 'Lucky beans.' In the Northern Islands it is known as 'Milk bush.' This plant belongs to the Allamanda order (*Apocyneae*) and has, indeed, a very similar yellow flower. The seeds are usually mounted as pendants.

SISAL HEMP IN THE UNITED STATES.

The *Hawaiian Forester and Agriculturist* gives the following extract showing the quantities and values of the importations of sisal for the last ten years:—

Year.	Tons.	Value.	Per ton.
1894	48,468	$ 3,742,073	$ 77·20
1895	47,596	2,743,396	59·76
1896	52,130	3,412,760	65·46
1897	63,266	3,834,732	60·61
1898	69,322	5,169,900	74·58
1899	71,898	9,211,377	128·12
1900	76,921	11,782,263	153·17
1901	70,076	7,972,564	113·77
1902	89,583	11,961,213	134·00
1903	87,025	13,289,444	152·70

During the ten years cited it will be seen that the importations have not only nearly doubled, but the price obtained per ton has, during the same time, increased proportionately, making the value for 1903 approximately four times as much as that for 1894.

Pens for Exhibiting Poultry. The manner in which poultry are exhibited at many of the Agricultural Shows in the West Indies is far from satisfactory. Birds are frequently placed in wooden boxes that are much too small for them: considerable damage—sometimes to valuable birds—is often the result. With a view to bringing about some improvement in this connexion, it is proposed to import for the use of the Imperial Department of Agriculture a number of specially constructed poultry pens, with sheet-iron divisions. It might be well if the Agricultural Societies in the various islands were also to import these pens. They can be obtained from John Penketh, 22, Market Place, Manchester, in four sizes, viz., 27 x 24 inches, 24 inches, 21 inches, and 18 inches square.

GLEANINGS.

Persons desiring to obtain a further supply of the onion seed imported from Teneriffe by the Imperial Department of Agriculture should apply to the Hon. C. A. Shand, Nevis.

In 1903, Surinam exported 370 tons of balata worth 741,542 gulden, as against 321 tons worth 562,587 gulden, in 1902. (*India-rubber Journal.*)

The total number of bales of cotton imported into the United Kingdom from the West Indies during the quarter ended September 30 was 901, weighing 2,156 cwt. (*Board of Trade Journal.*)

In an interview with a representative of the Jamaica *Times*, Mr. F. A. Hooper, the local representative of the A. I. Root Company, emphasized the necessity of making the bottles in which honey is shipped as attractive as possible.

Mr. Maxwell Hall, M. A., Resident Magistrate in Jamaica, contributes to the *Monthly Weather Review* (August) of the U.S. Department of Agriculture, an interesting article on the 'Origin of the Cuba cyclones of June 13-14, 1904.'

The United States Consul-General at Vienna reports that there is an immediate demand by manufacturers for potato starch. This might be a favourable opportunity for making trial shipments of cassava starch from the West Indies.

The last year has seen some six or seven new banana plantations started on a large scale by American companies in Honduras. Not only are plantations being made on the line of the railway and for 100 miles into the interior, but the coast is also being developed. (U.S. *Monthly Consular Reports.*)

H. M. Consul at Palermo, in a recent despatch to the Foreign Office, reports for the benefit of the lemon-growing colonies and the green fruit trade, that the prospects of the new harvest of lemons in Sicily are bad. The new crop is estimated to be half an average one. (*Board of Trade Journal.*)

According to *Lloyds' Weekly News*, several consignments of choice English pears, apples, and plums were, during the present season, despatched from Covent Garden market to Jamaica. It is reported that the fruit sold for double the price it would have fetched at home and returned a handsome profit. These exportations are to be repeated next season, and continued until the trade is put upon a permanent basis.

With a view to the encouragement of the cotton industry in the British Central Africa Protectorate, the import duty on the following articles has been temporarily removed: cotton seed, bisulphide of carbon, corrosive sublimate, Paris green, and London purple.

With rare exceptions, the consumption of tobacco per head in the United Kingdom has increased for a great number of years, although commercial depression or higher prices may at times have caused a slackening in the rate of increase. (*Chamber of Commerce Journal.*)

The quantities (in kilograms) of the principal exports of Mauritius during 1903 were as follows: Sugar, 170,416,541; rum, 45,453 (litres); molasses, 11,412,425; cocoa-nut oil, 4,462; aloe fibre, 1,518,648; and vanilla, 3,486. (*Annual Report* for 1903.)

A company has been registered under the title of 'Pita, Ltd.,' with a capital of £8,000 in £1 shares (1,000 deferred), to acquire the sisal plantations and works at West Caicos, Turks Island, to manufacture and deal in sisal, ramie, cotton, and other fibrous substances. (*Textile Mercury.*)

Mr. A. J. Brooks, Acting Curator of the Botanic Station at Dominica, writes that he has received from Mr. R. Colthurst a supply of seeds of the seeded variety of the bread-fruit (*Artocarpus incisa*, var. *seminifera*). The seeds have been sown, and Mr. Brooks will be pleased to supply other stations with plants when ready.

During the fortnight ended November 3, 13 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West India, 4·25*d.* to 5·58*d.* per lb.; West India Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb. (*West India Committee Circular.*)

We learn from the Dominica *Guardian* that the 'Dominica Sulphur and Shipping Co.' is carrying on the sulphur industry in Dominica, Montserrat, and St. Lucia. Very good work is being done at Soufrière, and some of the finest specimens of crude sulphur obtained from the works there are on view in Roseau.

Mr. H. E. Henderson-Davis, who was recently acting as Commissioner of the Cayman Islands, has written to the Jamaica *Daily Telegraph* on the subject of the industries of the dependency. He states that there are hundreds of acres of land available and suitable for cotton cultivation, and an experiment in that direction has already proved successful.

In connexion with the note in the *Agricultural News*, (Vol. III, p. 364), referring to the publication as picture post-cards of the illustrations that have been appearing in the *West India Committee Circular*, it may be mentioned that Mr. J. Baeza has been appointed agent for the sale of these cards in Barbados.

The illustrated articles on a trip from Canada to the West Indies in the *Toronto Saturday Night*, to which reference has already been made in the *Agricultural News* (Vol. III, p. 380), are being continued. The issues for October 29 and November 5 have a number of illustrations of typical Barbados and St. Vincent scenes including the Botanic Station and Agricultural School in the latter island.

WEST INDIAN PRODUCTS.

Canada.

The following is Mr. J. Russell Murray's monthly report, dated November 9, on West Indian produce in Canada :—

The past month has proved, on the whole, a good month for business, notwithstanding there was a general feeling of unrest caused by the elections which took place on November 3.

Sugar.—During the past fortnight the European sugar market has seen one of those unexpected changes in prices such as has not been experienced for very many years, viz., an advance of 1*s.* 6*d.*, within the week ending November 3, for 89° beet sugar ; and during the following days to date the movement upwards continues though less violent. Offers of Demerara at $2·28 for New York were withdrawn on the 5th. inst., and to-day's prices there indicate $2·75, c. & f. for 96° centrifugals. The S.S. 'Etolia' from Demerara with a cargo of sugar is shortly expected here, and the S.S. 'Inishowen' is due with a cargo of Belgian beet sugar for one of the refineries. These will be the last sugar steamers here, navigation closing about the 20th. inst.

The Ontario beet crop reports indicate a better yield per acre this year. The latest report states that 10,100 acres were grown this year, with an estimated yield of 5,900 tons ; last year 16,710 acres were planted and yielded 6,710 tons, but there is a large reduction in area. The refineries advanced prices 20c. during the last ten days for granulated.

Molasses.—The market remains very firm, but little business is being effected in Montreal. In Ontario and New Brunswick the same conditions exist.

Cocoa-nuts.—Prices have continued firm during the last month. An advance of about $1·00 per 1,000 has been obtained, but the near approach of winter will cause a sharp fall in consumption and a consequent weakening in prices.

Spices.—A steady market, and without material change. Advices from ports of origin indicate no advances, and consequently our market remains unaltered. A parcel of fair to bold Jamaica pimento realized 6c. per lb., but markets having been well supplied during the last month at 5c. and 5½c. prevented a full value being realized. Ginger stocks are very heavy and flat.

Fruit.—Jamaica oranges continue to arrive in fine order at very low rates, last shipment being placed at $3·65 per barrel duty paid, making the rate $2·10, f.o.b. Jamaica. Dominica fruits have been arriving under very adverse conditions. Barrels in my last three consignments have shown 20 to 30 per cent. decay. Boxes have been much better ; in several instances they arrived in perfect order. Prices varying from $1·50 to $1·75 per box duty paid. Boxes containing 250's should not be sent to this market ; 156's to 216's are the best sizes. Unless of large size, grape-fruit is unsaleable, 64's to box is the best size. Mexican oranges are due this week and are guaranteed sound throughout ; price for all sizes $2·05 per box duty paid, delivered to buyers.

NOTES.

Oranges.—Shippers should shorten supplies by December 15. In October report prices should have been marked duty paid. [See *Agricultural News*, Vol. III, p. 383—'Market Reports.']

Cocoa-nuts.—Contracts for supplies will be made as from January 1.

Banana Trade at Halifax.

The U. S. *Monthly Consular Reports* for September 1904 has the following note, by Mr. W. R. Holloway, Consul-General at Halifax, on the banana trade in that city :—

There is a large and increasing trade at Halifax in tropical fruits which are largely supplied by Boston dealers, though there are occasional importations direct from the West Indies.

The Boston dealers are now proposing to sell bananas, which form a large percentage of the purchases, by weight instead of by bunches as heretofore. Selling by weight will necessitate increased handling of the fruit by the jobbers, thereby subjecting it to extra risk from bruising, and will put them to the expense of installing overhead trolley scales like those used by butchers for weighing whole carcasses, and the buyer and seller will have to judge the quality, two or three grades being established at different prices. The business will be conducted on principle instead of by the present rule-of-thumb method. In estimating, quality, size, colour, and firmness have to be taken into consideration. The trade does not like what are called 'razorbacks,' or skinny, seamy bananas. For nice, plump fruit the trade would willingly pay one-fourth more, as the 'razorbacks' are of poor flavour.

The large dealers here have special buildings where green bananas are hung and ripened by heat. The trade this season has been very good. Prices are high and the supply has been equal to the requirements, although at times orders have been cut down.

There has been some inquiry from the United States at this consulate as to the market for banana flour, but it is not known to the Halifax trade.

WEST INDIAN AGRICULTURAL CONFERENCE.

The following is a letter, dated October 28, received by the Imperial Commissioner of Agriculture from the Hon. Hugh Clifford, C.M.G., Colonial Secretary, Trinidad, on the subejct of the West Indian Agricultural Conference, 1905 :—

Referring to your letter of the 24th. inst. on the subject of the next West Indian Agricultural Conference, which it is proposed to hold in Trinidad in January next, I am directed by the Governor to inform you that it affords his Excellency pleasure to offer the use of the Council Chamber for the meetings of the Conference.

I am to add that his Excellency will be happy to be present at the opening and to do anything in his power to promote the object of the Conference.

Free transit by the Government railways and by the Gulf Steamers will also be allowed to the members of the Conference.

Several prominent agriculturists have already signified their intention of being present at the Conference and taking part in the discussions. The Conference promises to be interesting and useful.

An additional feature of interest in connexion with this Conference is the proposed annual sale of stock at the Trinidad Government Farm which is to take place on Wednesday, January 11, 1905. It is likely that the Conference will adjourn for the day to admit of the representatives attending the sale and seeing the class of stock produced at the farm.

MARKET REPORTS.

London,—November 8, 1904. Messrs. J. HALES CAIRD & Co., Messrs. KEARTON, PIPER & Co., Messrs. E. A. DE PASS & Co., 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 4; and 'THE PUBLIC LEDGER,' October 29, 1904.

ALOES—Barbados, 13/- to 35/-; Curaçoa, 14/- to 38/- per cwt.
ARROWROOT—St. Vincent, 1¾*d.* per lb.
BALATA—Block, 1/3 to 1/3½ per lb.
BEES'-WAX—£7 2*s.* 6*d.* to £7 5*s.* per cwt.
CACAO—Trinidad, 57/- to 65/- per cwt.; Grenada, 53/- to 57/6 per cwt.; Jamaica, 53/- to 55/- per cwt.
CARDAMOMS—Mysore, 7½*d.* to 2/- per lb.
COFFEE—Jamaica, good ordinary, 37/- to 38/- per cwt.
COTTON—West Indian Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—Jamaica, 10/- to 11/- per box.
ORANGES—9/6 to 11/- per box of 150-176.
PINE-APPLES—Jamaica 1/- to 1/6 each.
FUSTIC—£3 10*s.* to £4 per ton.
GINGER—Fair bright, 45/-; Jamaica, common to good common, 28/- to 31/6 per cwt.
HONEY—Jamaica, 19/- to 22/6 per cwt.
ISINGLASS—West Indian lump, 2/4 to 2/8; cake, 1/3 per lb.
KOLA NUTS—4*d.* to 7*d.* per lb.
LIME JUICE—Raw, 9*d.* to 1/2 per gallon; concentrated, £13 17*s.* 6*d.* per cask of 108 gallons.
LIME OIL—Distilled, 1/5 per lb.; hand-pressed, 2/6 to 2/9 per lb.
LOGWOOD—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
MACE—Pale, 1/5 to 1/10; red, 1/1 to 1/4; broken, 10½*d.* per lb.
NITRATE OF SODA—Agricultural, £10 10*s.* per ton.
NUTMEGS—64's, 2/1; 84's, 1/2; 163's, 5½*d.* per lb.
PIMENTO—2½*d.* per lb.
RUM—Demerara, 8½*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
SARSAPARILLA—7½*d.* to 1/2 per lb.
SUGAR—Yellow crystals, 20/6 to 21/9 per cwt.; Muscovado, Barbados, 14/6 to 15/- per cwt.; Molasses, 13/6 to 17/- per cwt.
SULPHATE OF AMMONIA—£12 5*s.* to £12 7*s.* 6*d.* per ton.

Montreal,—November 9, 1904.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

BANANAS—Jamaica, 50c. to 75c. per bunch of 8 hands; $1·00 per bunch 'firsts'; $1·30 to $1·40 per bunch 'jumbos.'
CEDAR—Trinidad, 40c. per cubic foot.
COCOA-NUTS—Jamaica, $26·00 to $28·00; Trinidad, $22·00 to $24·00 per M.
COFFEE—Jamaica, medium, 9c. to 10c. per lb.
GINGER—Jamaica, unbleached, 6¾c. to 8c. per lb.
MOLASCUIT—Demerara, $1·32 per 100 lb.
MOLASSES—Barbados, 25c. to 27c.; Antigua, 21c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 20c. to 20½c. per lb.
ORANGES—Jamaica, $3·60 per barrel; Dominica, $3·75 per barrel; $1·75 per box, (duty paid).
PIMENTO—Jamaica, 5½c. to 6c. per lb.
PINE-APPLES—No quotations.
SUGAR—Grey Crystals, 96°, $2·90 to $3·00 per 100 lb.
—Muscovados, 89°, $2·75 to $2·80 per 100 lb.
—Molasses, 89°, $2·50 to $2·60 per 100 lb.
—Barbados, 89°, $2·60 to $2·75 per 100 lb.

New York,—November 11, 1904.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12¼c. to 13c.; Grenada, 11½c. to 12c.; Trinidad, 12c. to 13c. per lb.
COCOA-NUTS—Trinidads, $28·00 to $30·00 per M., selected; Jamaicas, $31·00 to $34·00 per M.
COFFEE—Jamaica, good ordinary, 8¾c. to 9c. per lb.
GOAT SKINS—Jamaicas, 53c. to 54c. per lb.
GRAPE FRUIT—Jamaicas, $4·00 to $5·00 per barrel.
ORANGES—Jamaica, $2·75 to $3·25 per barrel.
PIMENTO—4½c. per lb.
SUGAR—Centrifugals, 96°, 4 7/16c.; Muscovados, 89°, 3 15/16c.; Molasses, 89°, 3 11/16c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—November 19, 1904.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·60 to $3·75 per 100 lb.
CACAO—Dominica, $11·75 to $12·00 per 100 lb.
COCOA-NUTS—$17·00 to $19·00 per M. for husked nuts.
COFFEE—$10·00 to $12·00 per 100 lb.
HAY—90c. to 95c. per 100 lb.
MANURES—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
ONIONS—Madeira (stringed), $2·25 per 100 lb.
POTATOS, ENGLISH—$2·04 to $2·30 per 160 lb.
RICE—Ballam, $4·75 to $4·90 per bag (190 lb.); Patna, $3·25 to $3·40 per 100 lb.

British Guiana,—November 17, 1904.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, $7·50 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—$6·50 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, 13½c. per lb. (retail).
—Creole, 11c. per lb.
DHAL—$4·20 to $4·25 per bag of 168 lb.
EDDOES—96c. per barrel.
MOLASSES—Vacuum Pan yellow, 16c. per gallon (casks included).
ONIONS—Madeira, $3·00 to $3·50 per 100 lb.
PEA NUTS—American, 7c. per lb. (retail).
PLANTAINS—24c. to 40c. per bunch.
POTATOS, ENGLISH—$3·50 per barrel.
RICE—Ballam, $4·40; Creole, $4·40 per 177 lb., ex store.
SWEET POTATOS—Barbados, 96c. per bag, $1·08 per barrel.
TANNIAS—$2·16 per barrel.
YAMS—White, $2·28 per bag.
SUGAR—Dark Crystals, $2·65 to $2·90; Yellow, $3·00 to $3·10; White, $3·60 to $3·90; Molasses, $2·25 to $2·40 per 100 lb.
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00, $3·75, and $5·50 per M.

Trinidad,—November 17, 1904.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary, $12·00 to $12·10; Estates, $12·25 to $12·50; Venezuelan, $12 25 to $12·50 per fanega (110 lb.).
COCOA-NUTS—$19·00 per M., f.o.b.
COCOA-NUT OIL—71c. per Imperial gallon (casks included).
COFFEE—Venezuelan—No quotations.
COPRA—$3·00 to $3·20 per 100 lb.
ONIONS—$1·60 to $1·80 per 100 lb.
POTATOS, ENGLISH—75c. to $1·10 per 100 lb.
RICE—Yellow, $4·25 to $4·40; White Table, $4·50 to $5·50 per bag.

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Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 70. BARBADOS, DECEMBER 17, 1904. PRICE 1*d.*

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West Indian Agricultural Conference, 1905.

THE arrangements for the forthcoming Conference are in course of being completed, and there is every prospect that it will be even more successful than any of its predecessors. As already announced, the Conference will be opened in the Council Chamber at the Prince's Buildings, Port-of-Spain, Trinidad, on Wednesday, January 4, and it will probably close on Wednesday or Thursday in the following week, viz., on January 11 or 12.

The Conference will thus extend over several days. At previous Conferences, owing to the difficulty with regard to steamer services, two days only were available. This, therefore, is the first occasion on which it will be possible for the Representatives to deal fully and exhaustively with the numerous and important subjects brought before them. Hitherto, owing to the limited time at their disposal, some subjects on the programme of proceedings had to be omitted altogether, while the discussion on others had to be compressed within such narrow limits as to greatly lessen its value.

The Representatives will consist, as heretofore, of the principal officers connected with the Chemical, Botanical and Educational services, and the scientific officers on the staff of the Imperial Department of Agriculture. The Representatives of the Agricultural Boards and of the chief Agricultural Societies in the West Indies have in many cases already been appointed, and there is little doubt that in this respect the forthcoming Conference will be reinforced by members of the planting community whose recommendations and opinions will be listened to with due attention. The total number of Representatives will probably be less than on previous occasions, no doubt owing to the longer time they will be required to be absent from their homes. On the other hand, those

appointed are men of wide experience and knowledge, and with their assistance the results of the Conference cannot fail to advance the interests of these colonies.

A glance at the provisional programme of proceedings published in another column will show the importance of the subjects likely to be brought forward and discussed. As usual, the condition and prospects of the sugar industry are the first topics for discussion. Taking into consideration the very extensive series of experiments that have been carried on for several years with the view of raising new and richer varieties of canes and improving the commercial yield of sugar by means of artificial and other manures, the results to be submitted at this Conference should prove of special interest. The cacao industry, it is evident, would well repay any efforts that are made to keep the trees in good health and increase their productiveness. Experiments in this direction have already been started on successful lines. The use of cacao driers for drying the crops by artificial heat in unfavourable seasons is gradually extending. It would be useful to have the results so far attained clearly placed before the Conference.

The very successful cultivation of fruit in Jamaica has stimulated other colonies to endeavour to establish a fruit industry. Efforts at Barbados and Trinidad are full of promise and are likely to be prominently brought before the Conference. The cotton industry, on the lines now carried on, is comparatively new. The prospects of the present crop are so encouraging—that is, in localities suited to the requirements of the cotton plant—that everything of practical value connected with the industry would be a welcome addition to our knowledge of the subject. Amongst subjects of a general character papers on Agricultural Banks, on Rubber Plantations, on the occurrence of Anthrax, on the Hairy or Woolless Sheep of the West Indies, and on the local manufacture of Cocoa-nut oil may be cited as indicating the wide range of topics to be submitted for discussion outside the staple industries of these colonies.

It would be impossible to omit the consideration of the valuable work that is being carried on, everywhere, with the view of introducing the teaching of the principles of Agriculture into the Primary and Secondary Schools in the West Indies. In some colonies this work has received considerable attention and striking results such as those that have arisen in connexion with School Gardens and School Shows at Trinidad deserve to be prominently brought before the Conference.

The question whether or not Praedial Larceny is to be discussed in its general bearing on agricultural progress will probably be submitted for decision by the Representatives after their arrival at Trinidad.

It only remains to express the hope that all who are appointed to take part in the coming Conference will carefully study the provisional programme of proceedings and that they will do all that is possible to obtain such facts and figures as appertain to their respective colonies before they leave for the Conference. It may be added that it would greatly contribute to the interest and success of the Conference if specimens and samples were brought for exhibition, as well as to illustrate the remarks of the speakers.

SUGAR INDUSTRY.

'Male' Sugar-canes.

In a previous issue of the *Agricultural News* (Vol. II, p. 325), mention was made of the occurrence of so-called 'male' or 'man' sugar-canes in Antigua. Dr. Watts, who examined these specimens, stated that they were simply canes in which the side buds ('eyes') were slightly, or not at all, developed. Mr. J. R. Bovell, Agricultural Superintendent at Barbados, recently found some of these 'male' canes in the fields at Dodds Experiment Station. An examination of these specimens shows that the degree of suppression of the buds varies. In some cases these are normal at one or two nodes of a cane, and suppressed at all the others. In other cases a few of the buds can just be made out on very careful examination, while at the other nodes not the least trace of a bud is to be discovered. The variety of sugar-cane in this instance is B. 3,661. So far as is known, no explanation has been offered of this phenomenon.

Germany.

The *Consular Report* on the trade of Germany for the first half-year of 1904 has the following reference to the sugar industry:—

The sugar industry is seriously affected by the Brussels Sugar Convention, which, as was anticipated, checks the export of the formerly bounty-fed beet root sugar. The imports and exports for the last three years were as follows:—

	Imports in metric tons.			Exports in metric tons.		
	1904	1903	1902	1904	1903	1902
Raw sugar	131	108	88	172,480	148,172	274,640
Refined and other kinds	696	452	462	213,191	296,547	309,755
Total	827	560	550	385,671	444,719	584,395

The total production of sugar in Germany (calculated as raw sugar) was from

Sept. 1, 1903, to June 30, 1904, 1,896,644 metric tons.
Aug. 1, 1902, to June 30, 1903, 1,733,660 „ „
Aug. 1, 1901, to June 30, 1902, 2,269,896 „ „

The reduction of home prices, consequent upon the considerable abatement of the inland tax and the import duty, has increased the consumption nearly 50 per cent.

Jamaica.

In the last issue of the *Agricultural News* we published a short note on the prospects of the sugar industry of Jamaica. That there is a more hopeful outlook for this industry in that island appears to be confirmed by the following extract from the Annual Report of the Collector General. Special reference is made to the progress of cane farming :—

The injury caused by the storm to this industry was comparatively slight, owing to the fact that the main sugar districts were out of the area visited by the storm, but this crop has nevertheless suffered much by drought, and a shrinkage has to be recorded in the year's transactions. This is unfortunate, especially when it is remembered what a struggling industry this has been, but much is hoped from the abolition of the bounties in restoring the value of this industry, an industry that once placed Jamaica on the list of wealthy places. Possessing a soil suitable to the growing of the sugar-cane, Jamaica should be able to hold her own in the sugar markets of the world. The old troublesome problem of sufficient labour is one, however, still to be solved. Possibly the difficulty will be overcome in the near future by the peasantry taking seriously to cane farming, and in this connexion it may be interesting to note, that in Westmoreland the peasantry are planting canes for the purpose of supplying estates wherever land is available, and the canes so grown find a ready sale at 8*s*. per ton. One estate bought during the year 2,400 tons of small-settlers' canes, while in another instance, 50 tons were purchased. There is also promise in St. Elizabeth and Clarendon of an increasing trade between the peasant cane farmer and the estate.

The question of finding new markets for our sugar is also one that must be faced sooner or later, in view of the reciprocity treaty recently entered into between the United States of America and Cuba. Canada offers special advantages to British cane sugar entering the Canadian markets, and the preference amounting to about £1 a ton allowed by that country on British cane sugar should draw this product to the Canadian markets ; the sugar planters to secure this advantage would, however, be required to make such arrangements in obtaining a direct entrance into that market that would prevent the Canadian refiners from uniting to secure the preference to themselves.

The effect of the removal of the beet bounties is already showing itself in the increase in the consumptive capacity of Europe and America, and it is estimated that the world's consumption of sugar during the current year will show an increase of as much as 700,000 tons. This growing demand for a larger supply of sugar promises a ready market at better prices and may be taken as the silver lining to the cloud of depression that has long hung over this industry. These changed circumstances should put a check to the abandonment of sugar estates which has been going on year after year, and induce proprietors to replace antiquated plants by modern machinery and thus enable our sugar to be produced at a price that will not hamper competition.

ARBOR DAY.

Montserrat.

Mr. A. J. Jordan, Curator of the Botanic Station, has forwarded the following brief report on Arbor Day celebrations in Montserrat :—

Owing to local circumstances, it was found advisable to celebrate Arbor Day on different dates in the different districts. In Plymouth, November 7 was observed, and the children from the three schools assembled at the Court House at 10 a.m., and after addresses by his Honour the Commissioner and the Inspector of Schools on the objects of the observance of Arbor Day, they marched to the Windward Road leading from the town, and there planted young trees of locust and *Acacia arabica*. They then marched to 'The Hill' and planted mangos, seeded bread fruits (*Artocarpus incisa*, var. *seminifera*), and avocado pears.

On November 18 trees were planted at Harris Village by the children of St. George's school. Addresses were given by his Honour the Commissioner and the Inspector of Schools, and the trees were planted on a plot of land used as a playground for the school. The trees planted were Casuarina, mahogany, locust, *Acacia arabica*, and Spanish oak. A label, with the names of the children who planted it, and the date of planting, is being placed by the Manager of the school, before each tree to retain the interest of the children.

On November 21, Arbor Day was celebrated at Kinsale and St Patrick's. The children from Kinsale school marched to Fairfield Road and planted locust, *Acacia arabica*, Casuarina, and galba. At St. Patrick's the trees were planted on a piece of land adjoining the school. Addresses were given as on previous occasions. The trees used were date palms, mahogany, locust, *Gliricidia maculata*, Lagos silk rubber, Sesbania, *Acacia arabica*, and Casuarina. The Curator and staff of the Agricultural Department assisted in each district.

Trees were also planted at Cavalla Hill and Bethel schools, and also by several of the adult inhabitants upon their own land. Altogether 220 trees were distributed from Grove Station for the purpose of Arbor Day celebration.

Dominica.

The following is a brief account, forwarded by Mr. A. J. Brooks, Acting Curator of the Botanic Station, of celebrations in the country districts of Dominica. The celebrations in Roseau were referred to in our last issue (p. 390) :—

Arbor Day was celebrated in the country districts on December 1. Every school in the island took part in the movement. The planters in each district co-operated with the schools on this occasion.

In some cases the planters provided the plants for their own district. This was the case at Belvedere where Mr. P. Cox supplied plants of *Castilloa elastica* for planting along the public road.

The following plants were used on this occasion and distributed by the Botanic Station :—

Castilloa elastica and *Funtumia elastica*, mahogany (*Swietenia Mahagoni*), *Eucalyptus punctata*, saman (*Pithecolobium Saman*), locust (*Hymenaea Courbaril*), *Cassia Fistula*, *Cassia siamea*, almonds (*Terminalia Catappa*), and palms (*Areca Catechu*).

WEST INDIAN FRUIT.

DOMINICA FRUIT FOR LONDON EXHIBITIONS.

Mr. A. J. Brooks, Acting Curator of the Botanic Station, Dominica, writes as follows:—

The Dominica Agricultural Society forwarded by the mail leaving Dominica on November 11, 20 cases of fruits, etc., for the Royal Horticultural Society's Colonial Fruit Exhibition to be held in London on December 13 and 14. The cases contained:—

Mangosteens, carambolas, bananas (16 hands each bunch), limes, oranges (Washington navels, sweet and Seville), shaddocks, grape fruit, citrons, papaws, etc. Also samples of all citrus oils and juices, besides a splendid exhibit of various flours and meals, including banana flour, ginger powder, corn flour, clove powder, tumeric powder, pumpkin flour, cinnamon powder, tannia starch, arrowroot, etc.

ROYAL HORTICULTURAL SOCIETY'S FRUIT EXHIBITION AWARDS.

We extract from the Public Telegrams of December 13, the following list of awards secured by the West Indies at the above exhibition:—

The following awards have been made in connexion with the exhibition of Colonial fruit at the Royal Horticultural Hall. The Royal Horticultural Society's gold medal for Dominica and Barbados fruit, and Jamaica garden oranges shown by the West India Committee. A gold medal for preserves and a silver gilt medal for fruit to James Philip & Co., and a silver gilt medal to the Royal Mail Steam Packet Company for their display of West Indian fruits.

ORANGES IN PORTO RICO.

Bulletin No. 4 of the Porto Rico Agricultural Experiment Station deals with the propagation and marketing of oranges. It is stated that the cultivation of oranges in Porto Rico on a commercial scale has commenced since the American occupation and has not yet gone beyond the experimental stage. It is estimated that fully 6,000 acres have already been planted in budded trees secured either from Florida or local nurseries.

The orange having been grown for many years from seed, the fruits exhibit a great variation in quality. While some of the fruits are quite worthless, a few are as fine as can be found in California or Florida. It is recommended that growers should rather propagate from such trees as these than plant large areas with trees budded from varieties that are new to the island.

The bulletin has therefore been prepared with the view of instructing small growers throughout the island.

Detailed instructions are given as to the propagation of oranges by budding, and the formation of a grove. The writer also devotes some attention to working over old trees. The methods suggested in this connexion are crown grafting, top grafting, top budding, dormant budding, inarching, and bridge grafting. It is stated that, although it may seem wasteful to cut down a large tree bearing a comparatively good grade of fruit, it is astonishing how soon after working over the same tree will bear as large a crop of much finer fruit.

The directions are accompanied throughout with excellent illustrations which greatly enhance the value of the bulletin. This also applies to the instructions as to picking, grading, and marketing. Growers are warned not to ship inferior fruit: 'No fruit should be shipped out of Porto Rico unless it is of the very best quality and has been carefully graded and packed. A box of fruit generally sells in the market on the merit of the poorest specimens contained in it.'

BREAD-FRUIT MEAL.

The following is the result of an analysis by Professor J. P. d'Albuquerque of a sample of bread-fruit meal from St. Lucia:—

Moisture	12·13
Oil	1·33
Albuminoids *	3·51
Mucilage, starch, etc. ‡	77·00
Indigestible fibre	3·98
Ash †	2·05
	100·00

* Containing nitrogen	·56
‡ „ starch	68·81
† „ phosphoric anhydride	·21
† „ potash	1·00
† „ insoluble siliceous matter	·34
Value in units	89
Albuminoid ratio	1 to 22·09.

Professor d'Albuquerque remarks: 'This is a well prepared specimen of bread-fruit meal.'

COTTON INDUSTRY.

Prospects of the Crop.

Arrangements have been made for fortnightly reports to be sent in by the agricultural officer in each of the West India Islands in which cotton is being grown briefly reviewing the condition of the crop. The following is a short summary of the reports received by last mail:—

In Barbados, Mr. Bovell reports that the four inspectors who have been visiting and assisting the peasant proprietors have found that about 100 acres of cotton are being grown by peasants. The cotton, all over the island, appears to be in a healthy condition, and only in a very few instances have caterpillars been seen.

Mr. Jordan's report from Montserrat shows that pests—the cotton worm and the leaf-blister mite—have attacked the cotton, but that they have been kept in check and have not done serious damage. The black boll is present.

Similarly we learn from Mr. Shepherd that in St. Kitt's the plants are bearing well and ripening up rapidly; they are, on the whole, free from disease and insects.

In St. Vincent, Mr. Alexander Fraser has been appointed special emergency officer in connexion with the cotton industry. He has been actively engaged, with experiments that are being carried on at Rutland Vale for checking the attacks of the leaf-blister mite.

Jamaica.

Mr. John Barclay has submitted the following report on the prospects of cotton growing in Jamaica in continuation of the report published in the *Agricultural News*, Vol. III, p. 373:—

I have been making up statistics for Messrs. Oliver and Stancliffe and I find there is not much to add to what I reported before. Everybody has been waiting to see how the spring crops turn out and to hear the reports as to quality and price. Our cotton experiments have not had a fair chance as we took up the matter too late to catch the best planting time. Still a good many estates have done exceedingly well, but this lateness in planting and waiting for results made few people plant in the fall, and those who have planted, I am afraid, planted late again. But if the reports as to the quality by the cotton experts are satisfactory, it is very likely that there will be extensive plantings in March and April.

I have sent out enough seed to plant 778 acres, but many of the experiments have been abortive and many people did not plant all the seed. I do not think there are more than 50 acres altogether of Egyptian, and probably 400 to 500 in Sea Island at the present time, and some of that forms the first ratoon crop of what was planted last season. Mr. Oliver has reported against growing a ratoon crop, as it does not produce a good quality of cotton.

There will therefore be very little Jamaica cotton exported before the month of April next. I hope, however, that in the proper season, March and April, there will be extensive plantings.

I have already submitted some samples to Mr. Oliver. He tested them yesterday [November 27] when he declared that three samples from Dr. Pringle's estates in St. Mary, where cotton was grown as a catch-crop among young bananas, were exceedingly fine, the value running from 1*s.* 2*d.* to 1*s.* 4*d.* per lb. The other samples submitted varied, but some of them were also very good.

Consumption and Supply of Cotton.

The *Journal of the Khedivial Agricultural Society* (Vol. VI, no. 4) contains the following note by Mr. G. P. Foaden relative to the consumption and supply of cotton:—

During the last twenty years the consumption of cotton in the Southern United States has increased 1,607,000 bales, or 509 per cent.; the consumption in the North increased by 762,000 bales or 59 per cent.; and in the whole country, 2,369,000 bales, or nearly 148 per cent.

During this period the United States increased its cotton crop nearly 5½ million bales, or about 96 per cent.; India's crop increased 1½ million bales (of 400 lb. each), or 73 per cent.; the Egyptian crop by 570,000 bales (of 500 lb. each), or 75 per cent.; Russia, which formerly drew so largely on America for raw cotton, is now supplying her own mills with 200,000 to 300,000 bales grown in her Trans-Caspian provinces.

The consumption of cotton in Europe has been increased by 2½ million bales, or about 200 per cent. Japan has erected mills consuming 600,000 to 700,000 bales annually, of which nearly 25 per cent. is American. The world's consumption of cotton has increased nearly 7 million bales, or about 94 per cent., and the United States, which is the largest producer, has become also the largest consumer of cotton.

Picking Cotton.

The following remarks on the picking of cotton, made by Mr. E. Lomas Oliver, of the Deputation from the British Cotton-growing Association, deserve careful consideration by all growers of cotton:—

This point is probably the one which will require greater devotion to detail and more constant supervision on the part of planters than any other.

Good cotton may easily be depreciated 2*d.* or 3*d.* per lb. by careless and slovenly picking. The man who follows his pickers while at their work, until they are thoroughly educated as to what is required, is the man who will earn the highest reputation as a cotton grower.

The pickers must pick the cotton dry, clean, and free from leaf and trash: they must pick the cotton ripe, as no spinner likes to spin unripe cotton. When the cotton is perfectly ripe, the bolls will be fully open, and the cotton can be extracted from the boll without the employment of any force. If a planter will open a green pod and examine the fibre while the seeds are white, he will find that he can rub the fibres into a paste: in exactly the same manner the cotton-spinning machinery rubs the soft, unripe cotton into a spongy mass which is called 'nep.' It was this soft, spongy fibre which was so prominent a feature of West Indian cotton last year. Growers must learn to distinguish between cotton which is soft and cotton which is fine; the former is a defect, the latter is very desirable.

Sea Island Cotton Market. The following note is from the Sea Island Cotton Report of Messrs. H. W. Frost & Co., dated, Charleston, S. C., December 3:—'The market remains steady and unchanged with a continued demand for all of the receipts of odd bags at 27c. and 28c. to 28½c. We quote: fine to fully fine, 27c.; fully fine to extra fine, 28c. to 28½c.; extra fine crop lots, 31c. to 32c.; extra extra-fine crop lots at 40c. to 55c.' In comparison with this, it should be noted that Upland cotton was quoted on December 13 in the Liverpool market at 4⅛*d.* per lb.

WEST INDIAN AGRICULTURAL CONFERENCE 1905.

The following is a provisional list of the Representatives likely to be present at the Agricultural Conference to be held at Trinidad from January 4 to January 12 next. This list will be revised in accordance with the further information to be received by the mails to-day :—

President.

Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S., Imperial Commissioner of Agriculture for the West Indies.

Representatives.

JAMAICA.

The Director of Public Gardens and Plantations (the Hon. William Fawcett, B.Sc., F.L.S.). The Representative of the Board of Agriculture (the Hon. Henry Cork).

BRITISH GUIANA.

The Representative of the Board of Agriculture (the Hon. B. Howell Jones). The Superintendent of the Botanic Gardens (A. W. Bartlett Esq., B.A. B.Sc., F.L.S.). The Lecturer in Agriculture (E. W. F. English Esq., B.A.). The Assistant Instructor in Agriculture (J. E. Beckett Esq.).

TRINIDAD AND TOBAGO.

Representatives of the Trinidad Agricultural Society :—Peter Abel Esq. (Usine St. Madeleine), J. G. de Gannes Esq., and Edgar Tripp Esq., Secretary. The Government Analyst and Professor of Chemistry (Professor P. Carmody, F.I.C., F.C.S.). The Superintendent of the Royal Botanic Gardens (J. H. Hart Esq., F.L.S.). The Principal of Queen's Royal College (W. Burslem Esq., M.A.). The Principal of the College of the Immaculate Conception (the Rev. Father Neville).

Additional Representatives for Trinidad :—The Hon. G. Townsend Fenwick, C.M.G., and the Rev. Dr. Morton.

Representatives for Tobago :—The Hon. H. L. Thornton, T. L. M. Orde Esq., J.P., and the Curator of the Botanic Station, Tobago (Henry Millen Esq.).

WINDWARD ISLANDS.

Representative of the Grenada Agricultural Society (the Hon. D. S. De Freitas). The Inspector of Schools, Grenada (J. A. Harbin Esq.).

Representative of the St. Vincent Cotton Growers' Association (the Hon. Conrad J. Simmons). The Agricultural Superintendent, St. Vincent (W. N. Sands Esq.).

Representatives of the St. Lucia Agricultural Society :—The Hon. E. Du Boulay and C. R. Kennaway Esq. The Agricultural Instructor, St. Lucia (George S. Hudson Esq.).

BARBADOS.

Representatives of the Barbados Agricultural Society :—The Hon. Forster M. Alleyne, Vice-President, and——— The Island Professor of Chemistry in chemical charge of Sugar-cane Experiments (Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S.). The Agricultural Superintendent of Sugar-cane Experiments (J. R. Bovell Esq., F.L.S., F.C.S.). The Head Master of Harrison College (Horace Deighton Esq., M.A., F.R.A.S.).

LEEWARD ISLANDS.

The Government Analytical Chemist and Superintendent of Agriculture (the Hon. Francis Watts, C.M.G., D.Sc., F.I.C., F.C.S.). Dr. H. A. Alford Nicholls, C.M.G., M.D., F.L.S., etc., Author of 'Tropical Agriculture,' Dominica. The Officer-in-charge of the Agricultural School, Dominica (Archibald Brooks Esq.). His Honour the Commissioner, Montserrat (F. H. Watkins Esq., I.S.O.). The Resident Magistrate and President of the Agricultural Society, Nevis (the Hon. C. A. Shand). The Agricultural Superintendent, St. Kitt's-Nevis (F. R. Shepherd Esq.).

OFFICERS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

Imperial Commissioner of Agriculture for the West Indies (Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S.). Scientific Assistant (W. R. Buttenshaw Esq., M.A., B.Sc.). Mycologist and Agricultural Lecturer (L. Lewton-Brain Esq., B.A., F.L.S.). Entomologist (Henry A. Ballou Esq., B.Sc.).

Honorary Secretaries to the Conference—W. R. Buttenshaw Esq., M.A., B.Sc., and Alleyne Graham Howell Esq.

Programme of Proceedings.

The following is a preliminary programme of the subjects likely to be brought forward and discussed at the Conference :—

The Representatives appointed to attend this Conference will be received in the Council Chamber, Princes' Buildings, Port-of-Spain, Trinidad, by his Excellency the Governor (Sir Henry M. Jackson, K. C. M. G.) at 12 noon on Wednesday, January 4, 1905.

SUGAR INDUSTRY.

I. Results of recent experiments with Seedling Canes and Manurial Experiments in the West Indies. (Brief papers with discussion.)

II. Review of the principal Fungoid Diseases affecting the Sugar-cane. (Mr. L. Lewton-Brain, B.A., F.L.S.)

III. Review of the treatment of Insect Pests affecting the Sugar-cane. (Mr. Henry A. Ballou, B.Sc.).

IV. Field treatment of cane tops for planting purposes.

V. Cane farming at British Guiana and Trinidad. (The Hon. B. Howell Jones and Professor P. Carmody.)

VI. On the polarometric determination of Sucrose. (The Hon. Francis Watts, C.M.G., etc., and Mr. Harold A. Tempany, B.Sc., A.I.C.)

VII. On the Central Sugar Factory in course of being erected at Antigua. (The Hon. Francis Watts, C.M.G., etc.)

CACAO INDUSTRY.

VIII. Experiments in improving the health and productiveness of Cacao trees in the West Indies.

IX. Cacao-drying houses and the results so far attained.

X. Cacao cultivation and green dressing.

FRUIT INDUSTRY.

XI. The Fruit Industries of Jamaica, Barbados, Trinidad, and other parts of the West Indies. (Brief papers and discussion.)

COTTON INDUSTRY.

XII. Results of experiments in the cultivation of cotton at Barbados, St. Vincent, the Leeward Islands, and other colonies. (Brief statements and discussion.)

XIII. The principal Diseases of Cotton, and the best means of controlling them. (Mr. Henry A. Ballou, B.Sc., and Mr. L. Lewton-Brain, B.A., F.L.S.)

GENERAL SUBJECTS.

XIV. Agricultural Banks. (The Hon. William Fawcett, B.Sc., F.L.S.)

XV. Review of efforts to establish plantations of rubber-yielding trees in the West Indies.

XVI. The manufacture of Cocoa-nut oil in the West Indies. (Mr. W. Greig.)

XVII. The occurrence of Anthrax and the best means of controlling it. (Dr. C. W. Branch and Mr. H. A. Ballou.)

XVIII. The Hairy or Woolless Sheep of the West Indies. (Mr. W. R. Buttenshaw, M.A., B.Sc.)

XIX. The Present Position of Rice Cultivation in the West Indies.

XX. The influence of the soil on the special qualities of Agricultural Produce. (Mr. J. H. Hart, F.L.S.)

XXI. Are the special qualities possessed by individual plants sufficiently regarded? (Mr. J. H. Hart, F.L.S.)

XXII. Butter-making at Trinidad—with exhibits. (Mr. C. W. Meaden.)

EDUCATIONAL SUBJECTS.

XXIII. The Results of efforts to introduce the teaching of the principles of Agricultural Science into the Colleges and Schools in the West Indies. (Brief statements and discussion.)

XXIV. School Gardens and School Shows in Trinidad. (Mr. J. H. Collens, Inspector of Schools.)

XXV. Higher Agricultural Education at Trinidad. (Professor P. Carmody, F.I.C., F.C.S.)

Visits and Excursions.

The members of the Trinidad Agricultural Society are arranging for excursions to places of interest. The following are amongst the probable arrangements in regard to visits and excursions:—

Wednesday, January 4, 4.30 p.m.—Reception by Lady Jackson at Government House and visit to the Royal Botanic Gardens.

Thursday, January 5, 4.30 to 6 p.m.—Visit to the St. Clair Experiment Station; Mr. J. H. Hart, F.L.S., will meet visitors and show the various objects of interest.

Saturday, January 7.—A day's excursion to the Usine St. Madeleine, via San Fernando, proceeding afterwards to Princes' Town to lunch.

Monday, January 9.—Afternoon visit to Mr. Hoadley's cacao estate at Chaguanas to inspect a new steam-drying plant for cacao: also a factory for preparing concentrated lime juice and distilled oil.

Tuesday, January 10.—Probable all-day excursion by steamer to the Pitch Lake at La Brea.

Wednesday, January 11.—Afternoon visit to the Government Stock Farm at Valsayn. The annual sale of stock is fixed for this date. Catalogues of the sale may be obtained on application to the Secretaries of the Conference.

Thursday, January 12.—Afternoon visit to the fine cacao estate of Messrs. Borde Bros. at La Horqueta, and, if time permits, on to the newly opened district of Sangre Grande. The members of the Agricultural Society have kindly undertaken all arrangements for the entertainment of Representatives at the excursions on January 7, 10 and 12.

Bee Keeping in Bosnia. His Majesty's Consul-General at Serajevo reports: 'Great attention is being paid to the keeping of bees in this country, which promises to be very lucrative. Under the auspices of the Government an association, which already numbers 2,500 members, has been formed for the promotion of this industry, to which the Government contributes 4,000 kr. (£167) annually. There are already 6,000 hives on the most approved modern principles, and the honey produced is excellent.'

AFRICAN HAIRY SHEEP.

The following interesting note on African hairy sheep, also known as Barbados woolless sheep, by Mr. R. Lydekker, F.R.S., appeared in *The Field* of October 8:—

Those interested in the origin of our domesticated breeds of sheep should pay a visit to the Natural History Museum to inspect a very remarkable type which has just been added to the collection in the North Hall. The specimen in question is a ram of the red, hairy breed of sheep native to the West Coast of Africa, whence it has been exported to Barbados, the birthplace of the present example. Although an adult ram, the museum specimen has no signs of horns, but I believe these appendages are developed, in some instances at any rate, in the original African breed. The most striking features of the Barbados ram (which by the way, was presented to the museum by the Commissioner of Agriculture for the West Indies) are, firstly, the uniformly foxy-red colour of the coat, and, secondly, the short and hairy nature of the latter, which displays no tendency to woolliness, and is almost exactly similar to the summer coat of the wild mufflon or oorial. The head is, in fact, almost identical in form and general appearence with that of a female of one of those two species, and thus quite different from the long and slender head of the African wild sheep or oodad, which has been regarded by some as the ancestral stock of the domesticated breeds. The tail, too, is much shorter than in European domesticated sheep, not reaching to within a considerable distance of the hocks. From the uniform colour of the coat it would seem probable that the breed is more nearly related to the oorial than to the mufflon, and if the former were originally domesticated in Persia, it might well have been introduced into Africa by way of Syria. Be that as it may, it seems most likely that in the West African breed we have the earlier stock of the more specialized woolly breeds of Europe. An instructive case has just been arranged in the museum to exhibit some of the most extreme types of domesticated sheep. The exhibits include the above-mentioned hairy breed, the fat-rumped Hedjaz sheep, the four-horned African, the spiral-horned Wallachian, the Scotch mountain, the Leicester, and the Shropshire breeds.

It may be mentioned that at the request of the Chief of the Bureau of Animal Industry, a number of these sheep were procured by the Imperial Commissioner of Agriculture for the United States Department of Agriculture and shipped from Barbados to New York in July last. The animals arrived in excellent condition and have since been reported to be doing well in Tennessee. As mentioned elsewhere in this issue, this breed of sheep will form the subject of a discussion at the forthcoming West Indian Agricultural Conference at Trinidad.

DEPARTMENT NEWS.

Mr. Joseph Jones, Curator of the Botanic Station at Dominica, who has been on leave of absence since June 2, returned to the West Indies in R. M. S. 'Atrato' and resumed his duties on December 6.

Mr. J. C. Moore, Agricultural Superintendent at St. Lucia, also returned in the same steamer and resumed his duties on December 6.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 399 of this volume.

The *Agricultural News:* Price 1*d.* per number, post free 1½*d.* Annual subscription payable to Agents, 2*s.* 2*d.* Post free, 3*s.* 3*d.*

Agricultural News

Vol. III. SATURDAY, DECEMBER 17, 1904. No. 70.

NOTES AND COMMENTS.

Contents of Present Issue.

In the editorial to the present issue further information is given as to the arrangements that are in course of being made for the fifth West Indian Agricultural Conference. The provisional list of representatives and programme of proceedings will be found on pp. 406-7, as well as a list of excursions and visits that are being arranged.

The present position of the sugar trade in Germany is reviewed on p. 402. There has been a considerable increase in the consumption of sugar. A further note on the improved prospects of the industry in Jamaica will be found on p. 403.

Further notes on Arbor Day celebrations appear on p. 403. These relate to Dominica and Montserrat.

The prospects of the cotton crop in the West Indies are briefly reviewed on p. 405; also the prospects in Jamaica. A note on the consumption of cotton and directions by Mr. Oliver as to how cotton should be picked will also be found on this page.

On p. 407 will be found an interesting note from *The Field* on the Barbados breed of Woolless or Hairy Sheep.

Notes on several recent Agricultural and School Garden Shows are published on p. 413; also a list of shows to be held early next year under the auspices of the Imperial Department of Agriculture.

Mr. J. R. Jackson's usual monthly report on the London Drug and Spice Markets will be found on p. 414.

Lectures on Cotton in Antigua.

The Hon. F. Watts has reported upon the series of illustrated lectures on cotton cultivation in Antigua. Altogether twelve lectures have been delivered in that island; two by Mr. W. H. Patterson, Curator of the Botanic Station, and the others by clergymen of the various denominations in their respective schoolrooms. These gentlemen based their remarks largely upon the information contained in the pamphlet, *A. B. C. of Cotton Planting.* The lantern slides provided by the Imperial Department of Agriculture were used to illustrate all the lectures.

On the whole, considerable interest was taken by cotton growers in these lectures, and it is likely that they will bear fruit as cotton cultivation extends in Antigua.

Vanilla in the Seychelles.

In the *Annual Report* on the Seychelles considerable attention is devoted to the position of the trade in vanilla, which is still, in value, the most important article of cultivation for export. A table is published giving figures as to the exports and prices of this article, 'with a special view of illustrating the risks which attend the cultivation of tropical products for which there is only a limited market.' From 1898-1900 prices were very high (30-33 rupees per kilo.) owing to the expansion in demand; there followed a decline to 8½ rupees in 1903, owing to the reaction when manufacturers found the price too high and had recourse to substitutes. Now planters have to face the possible use of the substitute 'vanillin,' of which an account has been given in the *Agricultural News* (Vol. III, p. 103). As a result, planters are turning their attention to the cultivation of other tropical products.

Exports of Martinique.

The *Consular Report* on the trade of Martinique for 1903 has recently been issued. The value of the exports shows a decrease of £65,231 compared with that of the previous year.

The exports of sugar show a decrease of 5,906 tons in quantity, and of £61,679 in value. This decrease is stated to be due to a variety of causes, the chief being the low price of sugar. The crop of 1903-4 promises to be still smaller owing to the damage done to the young plants by the cyclone of August 1903. In 1903, 53,982 gallons less rum were exported; better prices, however, prevailing, £26,518 more were realized than in 1902.

The cacao plantations suffered much from the volcanic eruptions of 1902 and the cyclone of 1903. The exports of this product were 6,339 cwt., or 1,934 cwt. less than in 1902. Furthermore, as the plantations are situated within the zone of possible devastation from volcanic eruptions, it is not likely that the cultivation of cacao will be extended for the present. It is interesting to observe that the northern parts of the island, which were not devastated, but were evacuated as a measure of precaution, have been gradually re-occupied.

Arbor Day Celebrations.

In the last issue of the *Agricultural News* we published brief accounts of the celebration of Arbor Day in several of the West India Islands on the King's birthday, November 9. In the present issue are two further notes, one upon the celebrations in Montserrat where tree planting was carried out in several districts, and the other in reference to tree planting in the country districts of Dominica.

From these accounts it will be seen that this matter has been taken up in these islands with considerable enthusiasm. In all cases suitable addresses were given with the object of explaining clearly the purpose of the Arbor Day movement.

Exports of Jamaica.

The Annual Report of the Collector General, which appears as a supplement to the Jamaica *Gazette* of November 17, contains interesting information as to the exports of the island's products during the year ended March 31 last. As was only to be expected, the returns show the disastrous effect of the hurricane of August 1903.

Cocoa-nuts show a decrease in value from £67,902 in 1903 to £49,899 in 1904; bananas, from £1,134,750 to £585,243; citrus fruits, from £110,742 to £81,269; pimento, £91,997 to £88,847; sugar and rum, £324,242 to £218,750; coffee, £130,775 to £112,085; and cacao, £65,284 to £41,540.

On the other hand, an improvement is to be noticed in the following articles: kola nuts, from £243 in 1903 to £781 in 1904; walking sticks, from £222 to £1,111; logwood, from £97,106 to £110,928; logwood extract, from £33,363 to £47,609; tobacco leaf, from £157 to £582 (although cigars and cigarettes show a decrease); and lime juice, from £2,549 to £3,546.

Honey shows an increase in value of £1,473, but a decrease in quantity of 1,348 cwt.; lime juice, a decrease of 7,430 gallons, but an increase in value of £996.

As the Collector General states, this is a gloomy record, but the island is recovering from the damage sustained by the hurricane and drought; with the extension in the production of minor products, the removal of the sugar bounties, the extension of irrigation, and the better education of the people in agricultural matters, there is ground for hope that prosperity will not be long in returning.

Petroleum Resources of the West Indies.

A series of articles has appeared in the *Bulletin of the Imperial Institute* on the 'Petroleum Resources of the British Empire.' The third article, in the issue of September 29, is devoted to West Indian supplies. Petroleum and allied substances are met with in Cuba, San Domingo, Barbados, and Trinidad.

The commonest form of bitumen in Trinidad is asphaltum, known locally as pitch. It is found in and near the Pitch Lake close to the village of La Brea, as well as in several other localities. The purer varieties of bitumen are known as glance-pitch, asphalt-glance, or manjak. This form occurs in much less amount than asphalt. Liquid asphalt and petroleum occur in Guayaguayare Bay. The total value of the exports of asphalt and allied products from Trinidad in 1902-3 was £170,563.

In Barbados bitumen and petroleum are associated with the Scotland formation consisting, for the most part, of red, shaly, incoherent sandstones. Asphalt does not appear to be present, but manjak has been found at several points. Manjak was first worked in January 1896, and the new industry has met with considerable success, but recently the export has diminished, though the price has advanced. The largest output was in 1897 when 1,880 tons were exported: in 1903, 651 tons were exported, the price per ton being £10. It is exported mainly to the United States for use in the manufacture of Brunswick black and as an insulating material for electric cables. Petroleum is found in the valleys of the streams that flow by Turner's Hall Wood, Haggatt's and Baxter. It is also met with at Springfield and at Lloyd's Wells. In 1901-2 the total output was about 7,200 gallons. It is now used locally as a fuel and a lubricant, and sells at from 2*d.* to 6*d.* per gallon.

Colonial and Indian Exhibition, 1905.

In most of the West Indian Colonies preparations are being made for representation at the forthcoming Colonial and Indian Exhibition to be held at the Crystal Palace in 1905.

It is hoped that we shall be in a position to insert in the next issue of the *Agricultural News* a plan of the exhibition. From this it will be seen that the space allotted to the West Indies is in a most advantageous position.

A strong and influential committee has been appointed in Trinidad, with Professor Carmody as Chairman and Mr. J. H. Hart as Secretary. A vote of £1,500 has been approved of for the purpose of securing an adequate representation of the colony's products. The colony is to have 1,500 square feet of space.

As regards Jamaica, £1,000 is likely to be voted to meet the necessary expenses, and a space of 2,500 square feet has been applied for.

The Barbados House of Assembly unanimously voted on October 25 the sum of £400 to defray the expenses of the representation of the island at this exhibition. Preparations by a local committee, of which his Honour F. J. Clarke is Chairman, are in a forward state.

A committee has been appointed in Grenada to take charge of the arrangements for an exhibit, and the Government has been approached for the purpose of a grant to defray expenses.

We understand that Dominica has also decided to be represented.

At a recent meeting of the Royal Agricultural and Commercial Society of British Guiana it was intimated by the Chairman that the state of the funds of the society prevented it from assisting in the exhibition. It was, however, suggested that the society should forward exhibits collected by members and others.

INSECT NOTES.

St. Vincent.

The following are extracts from Mr. Ballou's report on his recent visit to St. Vincent :—

BOTANIC STATION.

A careful inspection of the nurseries and gardens at the Botanic Station was made and they were found to be in excellent condition. Several of the more common scale insects were seen, but with very few exceptions these were in small numbers and not causing any appreciable injury.

The Liberian coffee trees, mentioned in my last report, are much improved, though there are a few live scales still to be seen on them, and the cinnamon trees also are very much improved, though a few live scales (*Protopulvinaria pyriformis*) are still to be seen. The fiddle wood trees (*Citharexylum quadrangulare*) were attacked by a web worm. This insect could probably be best controlled by spraying with arsenate of lead, or the trees might be removed altogether except *one* specimen for the species.

Oranges do not thrive in the Botanic Station ; a few specimens are to be seen, but they have made very poor growth, and it would seem that the conditions are not right for them. A few live scales were to be found on each of them, and on a few many dead ones.

There were a number of trees on which black blight (*Capnodium* sp.) was to be seen, but the scale insects do not seem to do much harm. The mango trees and the Indian teak seemed to be most affected, especially the row of teaks at the upper entrance to the gardens. These are outside, but possibly an arrangement might be made to have them lopped and sprayed by the labourers from the garden.

There were but few plants in the nurseries at the time of my visit. Of these by far the greater number were cacao seedlings and they appeared to be healthy and free from scale or other insect pests. A few Bois Immortel plants were infested with white scale (*Diaspis amygdali*). These were to be taken out and destroyed.

AGRICULTURAL SCHOOL.

The cotton at the Agricultural School had made excellent growth. It was slightly attacked by the leaf-blister mite and a few cotton stainers were to be seen. A field of corn was badly attacked by the moth borer of the cane (*Diatraea saccharalis*) and the corn ear worm (? *Heliothis armigera*). This latter is probably the same insect that in years past has done much damage to cotton in the United States by boring into the cotton bolls, from which habit it has received the common name of 'cotton boll worm.' The corn ear worm was found only in the ears of the corn, but the moth borer of the cane was found in the stalk and the ear. The corn, when its condition was discovered, was at once cut and will be fed out as fast as possible. The yams in the plots above the school building had been attacked, and nearly all the leaves of some varieties were eaten. This was probably the work of the slug (*Veronicella occidentalis*), as no insects could be found and many slugs were hidden in the soil under the vines. This is said to be the season of greatest abundance of these animals. Paris green and lime dusted on the leaves would probably be an efficient remedy. The hedges and ornamental plants were found to be in good condition, also the cacao.

On Thursday, November 17, I gave a lecture to the boys at the agricultural school on insects and ways of combating them. It seemed necessary to make this lecture an elementary talk on account of the junior boys, some of whom had just been admitted to the school.

SUPPORTS FOR VANILLA.

Messrs. Schimmel & Co.'s *Semi-annual Report* has the following note on the above subject :—

De Cordemoy reports in the *Journal d'Agriculture Topicale* (Vol. 4, 1904, p. 104) on the experiences of the Réunion vanilla planters with regard to the supports used for training the vanilla plant. According to the author, wooden or metal poles have been entirely discarded there, and in the course of time the planters have adopted the use of trees as natural supports for the vanilla. The kinds which come especially under consideration are *Casuarina equisetifolia* Forts., called 'filao,' and further physic-nut (*Jatropha Curcas*) and the screw pine (*Pandanus utilis*). The 'filao' soon came out of use, as during the growth its bark peeled off, and the vanilla shoots lost their support. The experience with the Jatropha was favourable, but in the case of heavy shoots it was found too feeble and had to be supported by poles. The most satisfactory was the Pandanus, which through its numerous adventitious roots offers a sufficient resistance to the cyclones which occur so frequently in Réunion. It is usual to plant the vanilla cuttings close to the roots of a Pandanus, when the shoots very rapidly twine themselves round the roots and trunk. This method appears to be the one generally employed. Very remarkable is the occurrence of a microscopic fungus between the aerial root and bark of the living support, whose mycelial filaments penetrate not only the root-bark of the vanilla, but also the bark of the supporting tree, and, according to de Cordemoy, are important for the nutrition of the vanilla plant.

CITRONELLA GRASS IN CEYLON.

In a letter to the editor of the *Tropical Agriculturist*, dated October 1, commenting on the late Mr. C. J. Sawer's article in the *Chemist and Druggist* on 'Citronella and Lemon Grass in Ceylon, India, and the West Indies,' Dr. John C. Willis, Director of the Royal Botanic Gardens in Ceylon, makes the following observations with reference to citronella grass :—

There are two cultivated forms in Ceylon, called 'Lena Batu' and 'Maha Pangiri' respectively. A good account of them is given in Messrs. Schimmel & Co.'s *Semi-annual Report* for October 1898. 'Lena Batu' is the form cultivated by the native growers, and furnishes practically all the exported oil. 'Maha Pangiri' is the form cultivated by Messrs. Winter & Son at Baddegama, and gives a much finer oil, but needs more trouble in cultivation, having to be frequently replanted. The native prefers the 'Lena Batu,' because he does not need to replant it. He frequently abandons the cultivation when the grass is ten years old or more. The wild *Andropogon Nardus*, one of our most common grasses, is known to the Singhalese as 'Mana,' and is distinct from the cultivated forms ; it yields a good oil, but the quantity is smaller. Lemon grass is also cultivated in Ceylon, and we have a considerable quantity of it at the Experiment Station at Peradeniya.

JAMAICA: ANNUAL REPORT ON THE PUBLIC GARDENS AND PLANTATIONS, 1903-4. By W. Fawcett, B.Sc., F.L.S., Director.

This report is a record of the useful work done during the year in the various public gardens in Jamaica. It contains many interesting notes on experiments of various kinds, some of which it is proposed to publish in the *Agricultural News*.

Much damage was done to the gardens by the hurricane and this has entailed considerable extra work on the staff. Besides the damage done to the fine shade trees at Hope, the large and varied collection of orchids was sent flying in all directions. The nursery stock also suffered considerably and much time and care will have to be expended to work up the collection again.

The record of plant distribution is as follows: economic plants sold, 33,171 (cacao, 20,646); ornamental plants sold, 14,312; miscellaneous free grants (including cane tops and cuttings), 62,817.

The educational work at the Hope Experiment Station was continued; this included lessons to (1) Industrial School boys and apprentices, (2) students at Training Colleges, (3) Laboratory pupils, and (4) elementary school teachers.

The work of the Travelling Instructors is also reported upon.

MELO-COTON.

Seeds of a Mexican vegetable known as 'Melo-coton' have been received from Mr. J. H. Hart, F.L.S., Superintendent of the Trinidad Botanical Department. The following note regarding this vegetable appeared in the Trinidad *Bulletin of Miscellaneous Information* (Vol. V, p. 573):—

'Under the above name we have received a kind of squash, pumpkin, or marrow which is reported by Mr. E. J. Campbell, of the British Honduras Botanic Station, as coming from Mexico. This is a trailing cucurbit which gives long, smooth, green fruits, a foot in length and 4 to 5 inches in diameter. It is very prolific and makes an excellent substitute for the well-known vegetable marrow, which it much resembles when prepared for the table in its immature state. When ripe the fruit turns a dark, reddish brown. It is considered an acquisition to our list of table vegetables. Mr. Campbell describes the fruit as a "rare Mexican melon of handsome appearance and good flavour," and says "it is is eaten stewed with sugar and fresh."'

With regard to the last point, we are inclined to agree with Mr. Hart, who states in his last Annual Report: 'We have now seen and tasted the ripened fruit, which it was asserted could be used as a melon. It has a decided sweet melon taste, but it is not sufficiently enticing, in our opinion, to find favour as a desert fruit. As a vegetable, however, it is very useful and yields abundant crops.'

We learn from Mr. Hart that the plant bearing these fruits is reported by the Director of the Royal Botanic Gardens, Kew, as being *Sicana odorifera*, Naud.

LECTURES ON TROPICAL HYGIENE.

The following is a report by Mr. Austin H. Kirby, B. A., Agricultural and Science Master at Antigua, on a series of lectures on Tropical Hygiene recently delivered by him to teachers in elementary schools in Antigua. Such lectures as these should have a useful effect in spreading a knowledge of the causes of tropical diseases and their prevention:—

I have to report that lectures were given on Tropical Hygiene on the first Saturday in the months of March, April, May, June, September, and October in the science lecture-room at the Grammar School. Those which would otherwise have been given in July and August were omitted, in the one case on account of the Elementary School holidays, and in the other, because of non-attendance of the teachers owing to unfavourable weather. The omission of these lectures, however, did not cause any curtailment of the course, but merely postponed its termination.

Invitations to the lectures were issued through Mr. J. E. James, the Education Officer, to twenty-one teachers, and the average attendance during the whole course was ten. The small response was chiefly due to the difficulty which the teachers in the outlying districts have in getting means of transport to St. John's, and suggests that some aid of the nature of a grant toward this would be beneficial in the future.

The subject of the course was Tropical Hygiene, having especial regard to the following diseases: Malaria, Filariasis, Yellow Fever, Ankylostomiasis, Typhoid Fever, Cholera, and Dysentery. Preparatory to the more specialized work, a description was given of the circulatory and alimentary systems of the body. The lectures were chiefly illustrated by means of diagrams, either printed or specially prepared, and their subject-matter included information as to (a) the geographical distribution of the disease, (b) the life-history of the germ or parasite, if any, producing it, (c) the harmful effects on the body, and (d) the preventive measures to be taken, with the reasons for them. Very special attention was drawn to part (d) of the subject, and there is no doubt that interest in it was increased and the knowledge of it rendered easier of acquisition in view of the information gained in parts (b) and (c).

An intelligent interest was evinced by those who appeared regularly, and they are now in a position to impart very useful knowledge to the pupils under their charge. The greatest advances in hygienic reform can undoubtedly be made by the education of the rising generation in that direction. This points to the advisability of affording its teachers, as being those through whom it can be reached most successfully, better facilities for attending centres where they may gain the knowledge necessary to help such a plan to its fruition.

'Sun Pictures of the Antilles.' A feature of this book, which is to be published under the auspices of the West India Committee at the close of the year with the object of popularizing the West Indies, will be statistical information in a brief and popular form regarding the West Indies, which it is hoped will prove interesting to tourists and useful for purposes of reference generally. As has been mentioned in the *Agricultural News* (Vol. III, p. 304), this book consists of a series of photographs taken by the Secretary of the West India Committee, Full particulars can be obtained from Messrs. H. & W. Grant, 18-19, Whitefriars Street, E.C.

GLEANINGS.

The half-yearly examinations at the Agricultural Schools in St. Vincent, Dominica, and St. Lucia have been held during the past fortnight.

The exports of teak from Bangkok amounted in 1903 to 58,142 tons. First-class logs fetch £9 to £9 10*s.* per load; first-class planks from £10 to £12 10*s.* (*Consular Report.*)

It is interesting to observe in the *Consular Report* on the trade of Goa for 1903, that the average annual value of the exports of mangos from 1900-02 was 74,876 rupees (£4,992).

The provisional prize list for the Exhibition of the Agricultural and Commercial Society of Grenada, which is to be held in that island in February next under the auspices of the Imperial Department of Agriculture, has been issued.

Three additional prizes of $3 each are being offered by the Imperial Commissioner of Agriculture at the Annual Industrial Exhibition to be held at Barbados on December 20 for the best goats the progeny of the imported stud goats 'Black Rock' and 'Bruce.'

His Excellency Sir C. C. Knollys has formed the nucleus of an army which is to wage war on mosquitos in the city of St. John's, Antigua. This is an example worthy of being copied in all the West Indian Colonies. (*West India Committee Circular.*)

From Jamaica papers to hand by the mail we learn that Messrs. Oliver and Stancliffe, forming the Deputation from the British Cotton-growing Association, arrived in that island on November 25, and had paid a number of visits to estates on which cotton was being grown.

As a supplement to the November issue of the Cape of Good Hope *Agricultural Journal*, there is issued a chart (20 x 30 inches) to show at a glance what treatment should be given to trees to avoid or check specific insects and diseases.

From a report by the Officiating Chemist of the Natal Agricultural Department we learn that some sugar-canes (White Transparent, B. 109, and D. 95) sent to Natal from Antigua have made satisfactory growth and have proved acceptable to cane growers.

According to the *Cotton Trade Journal*, a cotton-picking machine is likely to be on the market for the coming picking season in the United States. Such a machine is among the great necessities of the age, and keen interest will be taken in the trials.

An intimation has been received by the Imperial Commissioner of Agriculture from the British Cotton-growing Association that two cotton seed disintegrators have been shipped for the Central Cotton Factories at Antigua and Barbados.

Mr. J. H. Hart, F.L.S., has written to the Imperial Commissioner of Agriculture, in response to a request for a supply of plants of the Trinidad seedless lime, that he will be happy to supply all the Botanic Stations as soon as a stock is available.

During the past fortnight 28 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West India, 5*d.* to 6·25*d.*; West India Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* (*West India Committee Circular*, November 22.)

It is desired to make the following corrections in the article on ornamental seeds in the last issue of the *Agricultural News* (p. 395): the specific name of the Circassian seed tree should read *pavonina* and that of the yellow 'rattle bush,' *retusa*. In the case of the soap-berry plant it is the covering of the seeds that is used as a substitute for soap.

At the Local Agricultural Exhibition to be held at Dunscombe, Barbados, on January 24, 1905, two additional prizes are being offered by ladies for the best working donkey (the property of a peasant who works it himself). This is with the view of obtaining better treatment for these useful little animals.

A correspondent has written asking what style of preparation for market is necessary in the case of kola nuts. It may be mentioned that there is a regular demand for nuts carefully cured and dried so that they may not become mouldy on the voyage. They should be packed in bags similar to those used for cacao. For recent prices for kola nuts see p. 414.

The principal items of export from the Society Islands, exclusive of mother-of-pearl, are copra and vanilla. According to the *Consular Report* just issued, the values of these during 1903 were £87,924 and £23,424, respectively. The increase in the value of the copra exports, as compared with 1902, amounted to no less than £14,254.

A bag of fruits of *Barringtonia speciosa* has been received from the Botanic Station, Antigua. Persons desiring these fruits should apply to the Imperial Commissioner of Agriculture. This handsome tree is a native of the Moluccas; from its seeds a lamp oil is obtained. Specimens already exist at Barbados, St. Vincent, Grenada, and Trinidad.

Reporting on an examination of two samples of cassava starch from St. Lucia, Professor J. P. d'Albuquerque remarks that, instead of being, as usual, slightly acid, they are slightly alkaline, a result due probably to the use of alkaline substances in the manufacture. Both samples were well prepared.

The inaugural meeting of the Association of Economic Biologists was held at Burlington House, London, on November 8. The object of the association is to promote the science of economic biology in its agricultural, horticultural, medical, educational, and commercial aspects. The Honorary Secretary is Mr. W. E. Collinge, M.Sc., the University, Birmingham.

AGRICULTURAL SHOWS.

Forthcoming Shows.

Arrangements are being made by local committees for the holding of the following Shows under the auspices of the Imperial Department of Agriculture early next year:—

Dominica.—February 23, 1905.

Montserrat.—The Fifth Annual Show will be held in the Market Place on February 24, 1905.

Antigua.—February 25, 1905.

Nevis.—A show will be held at Charlestown on February 28, 1905.

Barbados.—The Local Industrial Exhibition and Show of Stock for Peasant Proprietors will be held at Dunscombe plantation, St. Thomas, on January 24, 1905.

Grenada.—February 1905.

St. Vincent.—It is proposed to hold an Agricultural Show in March next.

Jamaica.

We take from the *Gleaner* of November 28 the following notes on the annual show at Kendal:—

The exhibits in every class showed a marked improvement on previous shows. The show was attended by a large crowd, his Excellency the Governor being among those who journeyed from Kingston. Unfortunately rain fell in the afternoon, which rather interfered with the attendance.

The exhibits were well arranged and the judging was carried on without a hitch. The cattle class was well represented, and some fine animals were shown. In the horsehind classes Kendal show always stands out above every other, and the lot seen could not have been equalled anywhere. There was a good exhibit of sheep. The minor products were limited in quantity but fine in quality, the best class being the citrus fruit and the cured coffee.

Schools' Show in Trinidad.

We learn from the *Port-of-Spain Gazette* that the third Annual School's Show was opened on November 29 at Tunapuna by his Excellency the Governor in the presence of a large and representative assemblage.

Sir Henry Jackson, in opening the show, stated that there could be nothing more useful than this friendly competition between the schools of the colony to produce the best garden and the best products of the garden. He was very glad to see that the young generation were being taught to turn their hands to agriculture and to develop the natural resources of the colony. He was very pleased at the improvement that had been made and he hoped it would continue year after year. He was sorry that Sir Daniel Morris, who had expressed his great disappointment at not being able to be present, had had to leave Trinidad that day.

Mr. J. H. Collens, Inspector of Schools, stated that much of the success of the show had been due to the excellent section that had been opened this year, for the first time, for the exhibits of outsiders, the prize money for which had been found by the Agricultural Society and local subscribers. Among those who had taken a specially active part in opening up that section was Professor Carmody, to whom and to the Agricultural Society their thanks were due.

The report continues: 'The show was an unqualified success, and the smoothness with which everything went off reflects very creditably on the management of the officials of the Education Office. . . The judges, Mr. J. H. Hart and Mr. J. McInroy for the agricultural produce, and Mrs. Smart and Mrs. Collens for the needlework, are unanimous in declaring the exhibits to have been extremely good, especially the needlework.'

School Garden Show at Tobago.

Mr. H. Millen, Curator of the Botanic Station in Tobago has forwarded the following note with reference to the second annual School Garden Show held on November 16:—

Twenty-three schools competed; the sections, classes, and number of exhibits surpassed those of the previous year by 171 exhibits. Several new features were added, and the exhibits were generally better than those of last year; besides vegetables, fruits, flowering plants, etc., good samples of native-made rope, cotton, and herbarium specimens were exhibited.

The Agricultural Society of Trinidad gave prizes to small proprietors for vegetable products. Although the above information was received late at Tobago and not much time given to exhibitors to prepare exhibits, yet a very creditable show in this section was made.

There were 40 exhibitors, 42 classes, and 143 exhibits.

Good exhibits of cacao pods, rice, and citrus fruits were represented; also samples of tobacco and cotton.

The officers of the Botanic Station gave assistance in arranging and judging, and several object-lessons prepared by the students of the station were also exhibited.

ROAD-SIDE PLANTING OF FRUIT TREES.

The following note, from the *Journal of the Board of Agriculture*, on the custom of planting fruit trees along the road-sides, which is quite a feature of certain parts of France and Germany, is worthy of consideration in connexion with the Arbor Day movement:—

In some parts of the Continent it is the practice to plant fruit trees in suitable positions along the road-side in place of the ornamental or forest trees more usually employed. The subject was discussed at the International Congress on Arboriculture of 1900, and a resolution was passed to the effect that in view of the injury, which is caused to adjoining lands by the presence along the roads of large trees with their far-reaching roots, the planting of fruit trees in their place should be encouraged. In France, during the past fifteen years, pear and apple trees have been planted in places along the national roads, and in 1901 it was stated that there were half a million fruit trees planted along French roads. As an example, it may be mentioned that in the Department of l'Oise, a distance of $182\frac{3}{4}$ miles has been planted with 57,795 trees, the total length suitable for fruit trees being $257\frac{3}{4}$ miles. The cost of planting and purchasing the trees is about the same as that of ornamental trees, and the sale of the fruit yields a small annual return. Apart, however, from the return, it is contended that the fruit tree serves equally well for shade, that its appearance when in flower is picturesque, while it serves the subsidiary purpose of interesting the population in the growth of fruit. The employment of the less edible varieties of fruit is recommended, and the cider apple is, perhaps, the most commonly used. The practice prevails also in parts of Germany. In Hanover there were in 1901, 189,586 trees planted on the road-side by the Provincial Government, which produced a revenue of £8,386, although a considerable proportion of the trees were not in full bearing.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on West Indian products in the London market during the month of October has been forwarded by Mr. John R. Jackson, A.L.S.:—

In the London drug markets the month of October opened very quietly, slightly improving as the month went on and ending with a generally better tone. No one product was marked by any prominence with, perhaps, the exception of quinine, which dropped at the close of the month to 11*d.* per oz. for German makes. At the spice sales, prices for all articles ruled at rates varying but slightly from those of the previous month. The following are the chief items:—

GINGER.

At the first sale on October 5, Jamaica was in small supply and partially sold at the following rates: middling boldish, 38*s.*; ordinary small dullish, 31*s.*; and common small, 25*s.* to 27*s.* About 130 packages of Cochin and Calicut were sold at this sale at ordinary rates, including 35*s.* to 36*s.* for fair unassorted native Cochin, and 26*s.* to 26*s.* 6*d.* for bright rough Calicut, slightly wormy. A week later over 600 packages of Jamaica were offered and were chiefly disposed of at previous rates; fair bright realizing 39*s.* to 40*s.*; middling dull, 35*s.* 6*d.* to 37*s.* 6*d.*; and common to ordinary, 28*s.* 6*d.* to 33*s.* At this sale native-cut Cochin was bought in at 38*s.* to 40*s.* On the 19th., of 400 packages of Jamaica offered, 36 were sold, fair bright fetching 45*s.*; ordinary to good ordinary, 28*s.* to 34*s.*; and common lean and dark ratoon, 25*s.* to 26*s.* Cochin and Calicut were offered in very large quantities and about half sold at firm prices, common small rough fetching 16*s.* 6*d.*

SARSAPARILLA.

At the first drug sale in the month 2 bales of genuine grey Jamaica were submitted to auction and 1*s.* 3*d.* per lb. accepted, 2 other bales having been sold privately. Three bales of very common Lima-Jamaica realized 7*d.* per lb., and 11*d.* was asked for a quantity of rather coarse, chumpy; 7½*d.* was paid for a bale of medium yellow native Jamaica, and 9½*d.* for medium red. At the last sale on the 27th., 46 bales of Jamaica were offered, all of which were sold. In consequence of its scarcity, grey Jamaica was readily disposed of at 1*s.* 2*d.* per lb. for good, and 11½*d.* for coarse, badly sea-damaged; for 15 bales of native Jamaica, 6½*d.* to 7½*d.* was paid for dull medium red to common mixed; for 3 bales of dull lean Lima-Jamaica, 11*d.* per lb. was obtained.

ARROWROOT.

At the first spice sale good manufacturing St. Vincent sold at 1¾*d.* to 1⅞*d.* per lb., and a week later 50 cases of coarse Natal were offered, 10 of which sold at 4½*d.* per lb. On the 19th., 580 packages of St. Vincent were offered and 498 sold at 1¾*d.*, and on the 26th. St. Vincent was again offered and bought in at from 2*d.* to 3*d.*, while 100 boxes of Natal, slightly country-damaged were disposed of at from 2⅛*d.* to 2¼*d.*

KOLA NUTS.

Kola nuts were offered at the first auction to the extent of 8 bags of dry Grenada, which realized from 2½*d.* to 3½*d.* per lb. In the middle of the month the quotations were: good washed Jamaica, 3½*d.*; and sea-damaged, 2¾*d.*; while for good bright washed, rather dark, 5*d.* was asked, a bid of 4*d.* being refused.

NUTMEGS, MACE, PIMENTO, ETC.

At the first sale nutmegs were in good supply and sold at firm to dearer rates, while West Indian mace realized higher prices than previously, the position of both remaining about the same to the end of the month.

Pimento was steady throughout the month, the prices ruling from 2½*d.* for ordinary, and 2⅝*d.* for fair. At these rates some 130 bags were sold at the mid-monthly sale out of 194 offered. At this sale 5 bags of dull West Indian Cassia Fistula were sold without reserve at 18*s.* per cwt.; 98 packages were offered.

In connexion with the subject of new drugs and other vegetable products which not infrequently find their way to the produce brokers, we may draw attention to the appearance during the month of a consignment of 35 bales of a wild or false ipecacuanha, the produce of *Asclepias curassavica*.

The use of a technical museum attached to warehouses and factories was proved by the identification of this sample with one contained in the museum attached to the Crutched Friars drug warehouse where the sample came originally from Trinidad under the name of Trinidad ipecacuanha.

MINOR INDUSTRIES IN JAMAICA.

The Annual Report of the Collector General in Jamaica contains the following reference to the progress of minor industries in that island:—

Cassava.—The interest taken in cassava growing is increasing, and 15 tons of starch manufactured from this plant have been exported to England. I learn that in one parish the manufacture of starch is to be undertaken on a large scale by a company, and if this enterprise passes through the experimental stage successfully, the manufacture of starch should become one of our paying industries.

Cotton.—The interest taken in the cultivation of cotton in this island is increasing steadily. Two small shipments have been made, indicating the beginning of what may yet prove to be a very important industry, and in this connexion I may mention that a gin has been erected on one property at which cotton from other places is prepared for market.

Rice.—Rice is grown in but few parishes, viz., Trelawny, Westmoreland and St. Catherine. The cultivation in Trelawny consists of 41 acres; in Westmoreland there are 100 acres under cultivation, and in St. Catherine 7 acres. This smallness of cultivation is disappointing, in the face of the fact that we send out of the country large sums of money to purchase a commodity which could be produced to a large extent at home.

Tea.—Tea is now grown in one parish, St. Ann, and a measure of success has attended this industry, but the cultivation has not yet been taken up by more than one proprietor. The collector for St. Ann reports that the undertaking is full of promise:—'The Hon. H. E. Cox (Custos) has been extending his tea cultivation, and it is pleasing to the eye as one drives along the roads passing the tea fields to see how beautifully they are kept; besides which he has imported machinery at an enormous cost for curing the tea, and it is hoped that his reward is looming ahead. The average expenditure per week is from £30 to £40, which is a boon to the people living in the district.'

Hard-woods.—Reference has from time to time been made to the hard-woods in the country, but there has been no attempt hitherto to show their value in money. The Director of the Jamaica Railway who has become a large purchaser of late years for the railway has, however, afforded some information from which it is gleaned that during the past year 69,795 hard-wood sleepers were supplied to the railway for which the sum of £13,587 was paid.

MARKET REPORTS.

London,—November 22, 1904. Messrs. J. Hales Caird & Co., Messrs. Kearton, Piper & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' November 18; and 'The Public Ledger,' November 19, 1904.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 16/- to 38/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* per lb.
Balata—Block, 1/3 to 1/3½ per lb.
Bees'-wax—£7 2*s.* 6*d.* per cwt.
Cacao—Trinidad, 56/- to 65/- per cwt.; Grenada, 54/- to 57/- per cwt.; Dominica, 50/- to 52/- per cwt.; Jamaica, 49/- to 54/- per cwt.
Cardamoms—Mysore, 7½*d.* to 2/- per lb.
Coffee—Jamaica, good ordinary, 37/- to 38/- per cwt.
Cotton—West Indian Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb.
Fruit—
Bananas—Jamaica, 4/6 to 7/- per bunch.
Grape Fruit—6/- to 7/- per case.
Oranges—10/- to 11/- per box of 150-176.
Pine-apples—Jamaica 1/- to 1/6 each.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Fair bright, 45/-; Jamaica, common to good common, 28/- to 31/6 per cwt.
Honey—Jamaica, 17/6 to 22/- per cwt.
Isinglass—West Indian lump, 2/4 to 2/8; cake, 1/3 per lb.
Kola Nuts—4*d.* to 6*d.* per lb.
Lime Juice—Raw, 9*d.* to 1/2 per gallon; concentrated, £13 17*s.* 6*d.* to £14 per cask of 108 gallons.
Lime Oil—Distilled, 1/4 per lb.; hand-pressed, 2/6 to 2/9 per lb.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Fine pale, 1/9; red, 1/1 to 1/3; broken, 1/- per lb.
Nitrate of Soda—Agricultural, £10 17*s.* 6*d.* per ton.
Nutmegs—70's, 2/4; 85's, 11*d.*; 140's, 5*d.* per lb.
Pimento—2½*d.* per lb.
Rum—Demerara, 8½*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
Sarsaparilla—7½*d.* to 1/2 per lb.
Sugar—Yellow crystals, 22/ to 23/6 per cwt.; Muscovado, Barbados, 16/- to 17/- per cwt.; Molasses, 14/- to 17/- per cwt.
Sulphate of Ammonia—£12 12*s.* 6*d.* per ton.

Montreal,—November 9, 1904.—Mr. J. Russell Murray. (In bond quotations, c. & f.)

Bananas—Jamaica, 50c. to 75c. per bunch of 8 hands; $1·00 per bunch 'firsts'; $1·30 to $1·40 per bunch 'jumbos.'
Cedar—Trinidad, 40c. per cubic foot.
Cocoa-nuts—Jamaica, $26·00 to $28·00; Trinidad, $22·00 to $24·00 per M.
Coffee—Jamaica, medium, 9c. to 10c. per lb.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb.
Molascuit—Demerara, $1·32 per 100 lb.
Molasses—Barbados, 25c. to 27c.; Antigua, 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 20c. to 20½c. per lb.
Oranges—Jamaica, $3·60 per barrel; Dominica, $3·75 per barrel: $1·75 per box (duty paid).
Pimento—Jamaica, 5½c. to 6c. per lb.
Pine-apples—No quotations.
Sugar—Grey Crystals, 96°, $2·90 to $3·00 per 100 lb.
—Muscovados, 89°, $2·75 to $2·80 per 100 lb.
—Molasses, 89°, $2·50 to $2·60 per 100 lb.
—Barbados, 89°, $2·60 to $2·75 per 100 lb.

New York,—November 25, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12¼c. to 13c.; Grenada, 11½c. to 11¾c.; Trinidad, 12c. to 13c. per lb.
Cocoa-nuts—Trinidads, $25·00 to $27·00 per M., selected; Jamaicas, $28·00 to $30·00 per M.
Coffee—Jamaica, good ordinary, 8¾c. to 9c. per lb.
Goat Skins—Jamaicas, 52½c. to 54c. per lb.
Grape Fruit—Jamaicas, $2·00 to $4·00 per barrel.
Oranges—Jamaica, $3·50 to $4·00 per barrel (stem cut).
Pimento—4½c. to 4⅝c. per lb.
Sugar—Centrifugals, 96°, 4¾c.; Muscovados, 89°, 4¼c.; Molasses, 89°, 4c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 3, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 to $3·75 per 100 lb.
Cacao—Dominica, $11·75 to $12·00 per 100 lb.
Cocoa-nuts—$13·00 per M. for husked nuts.
Coffee—$10·00 to $12·00 per 100 lb.
Hay—90c. to 95c. per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
Onions—Madeira (stringed), $3·00 to $3·50 per 100 lb. (retail).
Potatos, English—$2·00 to $2·25 per 160 lb.
Rice—Ballam, $4·85 per bag (190 lb.); Patna, $3·20 per 100 lb.

British Guiana,—December 1, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 per barrel.
Balata—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·00 per barrel.
Cocoa-nuts—$10·00 to $12·00 per M.
Coffee—Rio and Jamaica, 13½c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—$4·30 to $4·40 per bag of 168 lb.
Eddoes—80c. to $1·20 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—Madeira, $3·00 to $3·50 per 100 lb.
Pea Nuts—American, 7c. per lb. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$3·00 per barrel.
Rice—Ballam, $4·40; Creole, $4·40 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·08 per bag, $1·20 per barrel.
Tannias—$1·44 per barrel.
Yams—White, $2·16 per bag.
Sugar—Dark Crystals, $3·00 to $3·10; Yellow, $3·25 to $3·50; White, $4·00 to $4·25; Molasses, $2·60 to $3·00 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75, and $5·50 per M.

Trinidad,—December 1, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red, $11·90 to $12·25; Estates, $12·20 to $12·50; Venezuelan, $12·35 to $12·70 per fanega (110 lb.).
Cocoa-nuts—$19·00 per M., f.o.b.
Cocoa-nut Oil—71c. per Imperial gallon (casks included).
Coffee—Venezuelan—9c. to 10c. per lb.
Copra—$3·00 to $3·20 per 100 lb.
Onions—$1·60 to $1·80 per 100 lb.
Potatos, English—$1·00 to $1·25 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $4·50 to $5·50 per bag.

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'WEST INDIAN BULLETIN'

(VOL. IV, NO. 4.),

Containing full report by Sir Daniel Morris, K.C.M.G., D.Sc., and Mr. J. R. Bovell, F.L.S., F.C.S., on visit to the **Cotton-growing** districts of U.S.A.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. III. No. 71. BARBADOS, DECEMBER 31, 1904. PRICE 1*d.*

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The Cotton Market.

'THE American crop is colossal, and the decline in prices should prove to your planters the folly of suggesting the planting of any other cotton than Sea Island.' Thus wrote Mr. C. M. Wolstenholme, the well-known Liverpool cotton broker to the Imperial Commissioner of Agriculture by the last mail.

The crop referred to is, of course, that of ordinary or Upland cotton. The latest estimates place the present crop in the United States at about 11,000,000 bales. This represents an increase of something like 2,000,000 bales over last year's crop. It is only natural that this very large visible supply, in addition to all the cotton of a similar grade that is being produced in other countries, should have caused a considerable drop in prices. With the price of Upland cotton as low as it is to-day (about 4*d.* per lb.), its cultivation is scarcely likely to be profitable in these colonies.

The state of the market in Liverpool is indicated by the following quotation from the *Liverpool Cotton Association Weekly Circular* of November 25: 'The cotton market has been quiet throughout the week, prices have been easier, and quotations generally show a decline.' Again, the following week: 'The cotton market has been more active, but prices continue to decline.' The prices quoted on December 2 for American cotton were: middling, 4·77*d*; good middling, 4·87*d*. They have since fallen to 4·1*d.* per lb. If these quotations be compared with quotations for the same time last year (6·84*d.* and 6·92*d.*, respectively), it will be seen that the decline in prices has been considerable—nearly 3*d.* per lb.

Turning now to Sea Island cotton, we see at a glance that the market shows a different state of affairs. To quote again from the *Liverpool Cotton*

Association Weekly Circular: 'Sea Island descriptions have been neglected. The quotations for fancy Georgia and Florida are reduced ¼*d.* per lb. Forwarded this week 269 bales Sea Island.' And again a week later: 'Sea Island descriptions are in limited demand at unchanged rates. Forwarded this week 235 bales.' Similarly with Egyptian, it was reported that a limited business had been done and quotations had not undergone much change, varying according to quality from 7¼*d.* to 11¼*d.* A similar, but on the whole a more hopeful, position exists in the American Sea Island markets: Messrs. Frost & Co. report that at Charleston the market remains steady and unchanged with a continued demand, and the last report (dated November 25) from Messrs. W. W. Gordon & Co. states that the market 'continued quiet and steady, with a good demand at full prices.' The quotations, contained in Messrs. Frost's report for December 3, will be found on p. 405 of this volume of the *Agricultural News*. The quotations the following week were unchanged except for a decline of ½c. for fine to fully fine.

It will thus be seen that while the market for ordinary Upland has been affected to a considerable extent by the largely increased supplies, the Sea Island market (and the Egyptian also to some extent) has remained steady. The reason for this will readily be seen if we look to the crop estimates of the Sea Island sorts. The present crop is estimated at from 82,000 to 84,000 bales, as against 75,683 bales for the last crop, and 105,955 bales for the year before. The increase in production, therefore, is very slight, and consequently there has been nothing, so far at all events, to cause an appreciable fall in prices.

What it is desired to impress upon cotton growers in the West Indies is the fact that the markets for Upland and Sea Island cotton are entirely distinct. A decline in prices of Upland does not necessarily cause a corresponding decline in Sea Island. There is, therefore, no need for cotton planters here to take alarm at the somewhat sensational notices that appear from time to time with regard to fluctuations in the cotton market. They have to remember that, while the price of Upland cotton may be affected by large supplies or speculation, they have in Sea Island cotton a product for which there is a special market and a limited supply. The production is not likely to be increased to such an extent as to cause prices to drop below a figure at which its cultivation is remunerative. Provided that reasonable care be taken in producing and marketing Sea Island cotton of the highest quality, there appears to be no reason to doubt but that prices during the next season will be such as to leave a good margin of profit. In the opinion of those who are acquainted with all the facts and circumstances of the case, the price of fine Sea Island cotton is not likely to drop at any time below 1*s.* per lb.

Even in the event of an appreciable decline in the price of Sea Island cotton, we are inclined to think that this would ultimately have a beneficial effect. At its present high price, Sea Island cotton is out of the reach of many manufacturers who would be likely to use it if the price fell. Once Sea Island cotton had found a wider use, it is unlikely that, when the price rose again as a natural consequence of this increased demand, it would be discarded for a return to the common grades.

It would appear, therefore, that from a general review of the situation as existing to-day, the prospects of the growers of Sea Island cotton are as satisfactory as they can be; and no alarm need be felt at the movements that are taking place on the ordinary cotton market. They may have a temporary quieting effect upon the demand for Sea Island cotton, but the West Indies are aiming to supply an article which is practically unaffected by these movements.

SUGAR INDUSTRY.

Markets for West Indian Sugar.

The following is a memorandum, prepared by the Vice-President of the Westmoreland (Jamaica) Planters' Association, upon the situation with regard to the sugar market, which was adopted by the association at a meeting on December 7.

It would be well, however, to mention that recently, Canada has been giving better prices to West Indian growers:—

The price of centrifugals in New York to-day is 4¾c. per lb., the price of beet, f.o.b. Hamburg, is 14*s.* 6*d.* per cwt., equal to 5·12c. in New York; that is to say, whereas beet sugar would cost 5·12c. per lb., duty paid delivered in New York, centrifugals can be had there for 4¾c., a difference of ⅜c. per lb., or £1 15*s.* 9*d.* per ton against cane sugar.

The reason of this difference in price is obvious.

New York offers, and Cuba accepts, a price lower than the parity of beet, because Cuban sugars go into New York at a reduction on the United States import duties of 20 per cent., or about 34*s.* per ton; that is to say, Cuban sugar being bounty fed by the United States to the extent of 33*s.* per ton, 4¾c. per lb. is to Cuba as good as 5·12c. per lb. to, say, the British West Indies.

On the price paid Cuba the New York refiner bases his price for all other centrifugal sugar. On the New York prices the Halifax refiner bases his prices for British West Indian sugar. Therefore Halifax is paying for British West Indian sugar a figure much below the parity of beet, even after allowing 10*s.* per ton for rebate on duties.

In consequence of the bounty paid by the United States to Cuban sugars, New York is no longer a profitable market for the sugars of the British West Indies, nor can Canada be, if her prices are based on New York prices.

Canada buying British West Indian sugar on the parity of Cuban sugars in New York, instead of on the parity of beet, is paying less for our sugars than their value to-day in the United Kingdom.

Our muscovados are to-day quoted in Halifax at $3·30 per 100 lb. for 89°, but gauged by the price of beet they are worth $3·69 per 100 lb.

In other words, because our sugars are sold in Canada at a price based on bounty-fed Cuban sugar, instead of on the price of beet, we are getting about 35*s.* per ton less for our sugar than we should, or 25*s.* per ton less, if we deduct the 10*s.* per ton allowed us last year by the refiners as rebate on duties.

Under these circumstances, before we ship our sugar next season blindly to Halifax, it would be well for us to see what the United Kingdom market will do for us, for the price of our sugar in the United Kingdom is largely governed by the price of free beet, whereas in Canada it is entirely determined by the price of bounty-fed Cuban sugar.

In reference to the above, Mr. J. R. Bovell makes the following interesting statement: 'I hope soon to be in a position to say definitely how the price of sugar in Canada compares with New York and Great Britain, as I expect to ship 125 bags of sugar and 4 hogsheads of molasses for a planter to Toronto by the Pickford and Black steamer scheduled to leave on December 27. I may also add that from the *pro forma* sale received from Messrs. W. H. Millman & Sons, to whom I am sending the sugar, it would appear that the difference in favour of sugar shipped to Canada over that sent to New York is considerable.

Seedling Canes in Jamaica

The following reference to the work of raising seedling canes in Jamaica is made in the Annual Report of the Director of Public Gardens:—

A number of seeds were gathered at Hope and sown, resulting in 594 plants being set out at a distance of 5 feet by 5 feet in April last. When fully grown and ripe, ninety were selected as to agricultural yield and the remainder dug out and destroyed. Of these a final selection of thirty was made, the sixty being cut down to ratoon for another trial before finally discarding them. Twelve tops (six holes) of each of the thirty have been planted for chemical test next year.

The question of raising seedlings has now been taken up by estates, and, in the case of Mr. Burgess, with great success so far. Tops of D. 95, Po-a-ole, and White Transparent were planted mixed together at Mt. Eagle estate, as advised in the *Bulletin* for October 1900; these flowered together and were presumably cross-fertilized. The seeds, when ripe, were gathered by a former Hope apprentice, now in Mr. Burgess' employ, and forwarded to Hope, resulting in a batch of over 2,000 vigorous seedlings.

The following shows the varieties grown and the number of selections yielded by each:—

Parent.	No. of seedlings raised.	No. 1st. selection.	No. 2nd. selection.
D. 51	340	38	13
B. 109	17	1	1
D. 115	34	9	3
D. 80	51	1	2
D. 95	34	9	4
D. 37	34	2	1
D. 1,439	34	0	0
D. 99	68	0	2
D. 102	85	0	4
Total ...	697	60	30

EDUCATIONAL.

University of London Degree in Science for Colonial Candidates.

Revised regulations have recently been issued by the University of London for the holding in the colonies of its examinations for Matriculation and the degrees of B.D., LL.B., and B.Sc. From these we extract the following information with regard to the degree of Bachelor of Science:—

The first examination to be passed towards the attainment of a degree is that for Matriculation. Two more examinations must be passed after Matriculation before the student can obtain a Bachelor's degree. The Intermediate examination cannot be taken by a candidate unless he has matriculated not later than the preceding January, nor can the first degree examination be taken less than three years after matriculation.

In the Intermediate Examination in Science candidates shall be examined for a pass in any four subjects from the following: (1) Pure Mathematics, (2) Applied Mathematics, (3) Experimental Physics, (4) Chemistry, (5) Botany, (6) Zoology, (7) Geology. One at least of the four subjects selected must be taken from among the first three.

In the final examination candidates for a pass degree shall be examined in any three which may be selected from eleven subjects—which comprise the seven mentioned for the Intermediate, and in addition, Astronomy, Physiology, Psychology, and Logic and Methodology.

In the case of the examinations in science, the University requires an assurance that the Colonial Government will provide Assistant Examiners to supervise the practical examinations in adequate laboratories and report thereon to the University Examiners.

Applications are not received from individual candidates. Any person desiring to be examined at a colonial centre should apply, not to the University of London, but to the Government of the colony wherein he resides, to ascertain (*a*) whether any arrangement has already been made for holding an examination in the colony, or, if not, (*b*) whether the Government will make the necessary application to the Senate in order that such arrangement may be made.

Full information relating to degrees will be found in the University *Calendar*, which may be obtained (price, 5*s.* 10*d.*, post free) on application to—The Financial Secretary, University of London, South Kensington, London, S.W., England.

WEST INDIAN FRUIT.

BARBADOS BANANAS.

The following is a copy of a letter which has been addressed to the Superintendent of the Royal Mail Steam Packet Company in reference to the temperature to be observed for Barbados bananas when carried in the fruit chambers on board the 'Trent' and 'Tagus':—

Imperial Commissioner of Agriculture—to the Superintendent, R.M.S.P. Company, Barbados.

Barbados, December 17, 1904.

I believe that it would be desirable to place on record, in a clear manner, exactly what we would wish in the way of temperature when Barbados bananas in crates are shipped in the cool chambers on board the 'Trent' and 'Tagus.'

We should be satisfied if it would be possible to maintain a temperature not below 60° F. and not above 65° F. It is not necessary, however, that we should obtain a temperature of 65° immediately the fruit is put into the chamber at Barbados. If the temperature could start at about 75° or even 80° at Barbados, then it might be gradually reduced within a few days to 65° and, if possible, a day or two later to 60°, *but not lower*.

If during the winter months when approaching England, the temperature on deck falls below 60°, then the object of the officers should be to maintain the temperature in the fruit chamber from falling *below* that. This might be done by stopping the working of the fans for a brief period and carefully watching the results. The fans might be re-started directly the temperature rises above 65°.

As you are aware, this information is not of value to the officers on board the other ships, as they are not, as yet, fitted with cool chambers.

HYBRIDIZATION OF PINE-APPLES.

Reference has already been made in the *Agricultural News* (Vol. II, p. 404) to the experiments that are being carried out in the Botanic Gardens at Hope, Jamaica, with a view of producing hybrid pine-apples. The following extract on this subject is taken from the Annual Report on the Public Gardens and Plantations for the year ended March 31, 1904 :—

With a view of raising a variety of pine that would combine the fine appearance and shipping qualities of the Smooth Cayenne with the delicious flavour of the Ripley, experiments in hybridization were instituted in the year 1904.

No Cayenne plants being in flower at Hope when the Ripleys were ready for pollination, some flower heads were very kindly contributed by the late Mr. Chas. E. Smith. As a result of the initial experiment, sixty-four plants were raised and planted out. The Ripley flowers were cross-fertilized between April 25 and May 20, 1901, and the fruits ripened in the middle of July; the seeds were sown in clean sand the first week in August, the seedlings potted into bamboo pots early in September 1901, and planted out at a distance of 2 feet apart in August 1902. Several of the plants very quickly took the lead and grew vigorously, whilst a number of them exhibit a very feeble constitution: all differ from each other in appearance—some are spineless like the male parent, and some are spiny like the Ripley. The first fruit was cut on November 18, 1903, and was fairly good; the second one was stolen—it resembled very closely the 'Red Spanish.' The third to ripen was a curiosity, a rather poor 'Cayenne' devoid of top. Others are now developing fruits.

During 1901 preparations were made for extending this important work, and in the following year, 1902, Cayenne, Ripley, and Queen were brought into flower at the same time to permit of crossing and intercrossing; resulting in the following being raised:—

Ripley	×	Cayenne	900	seedlings.
Cayenne	×	Ripley	800	,,
Queen	×	Cayenne	100	,,
Queen	×	Ripley	25	,,
Ripley	×	Queen	120	,,
Fertilized by natural means			250	,,
Total			2,195	,,

These have been planted out at a distance of 9 inches apart in nursery beds, to be grown on to the sucker size and treated as such when large enough, e.g., dug up, trimmed, and planted out in 'field' beds.

The third batch, numbering 500, raised in 1903, is now being nursed in 3-inch pots in the glass-house.

Drying Copra in Samoa. The copra driers in Samoa all use the hot-air system. Air is heated in a fireplace and conducted through iron pipes which cross and recross the lower part of the building: the end of the pipe is generally turned into a smoke-stack. The drying is caused by a continuous current of air admitted through ventilators in the side of the building at its base. This air is warmed in passing the heated pipes, and then passes through and dries the trays of copra, and is drawn out at the roof by another set of latticed ventilators. (U.S. *Monthly Consular Reports.*)

COTTON INDUSTRY.

Prospects of the Crop.

From the fortnightly reports of local officers we extract the following information with regard to the condition and prospects of the cotton crop :—

In St. Vincent picking was being actively carried on, and it was estimated that over 80,000 lb. of seed-cotton had been picked up to December 16. The leaf-blister mite was present in several cultivations but not in alarming proportions.

In St. Kitt's, Mr. Shepherd reports, cotton was being picked on several estates, and the product was clean and of very good quality. On most of the other estates the plants were well advanced and promising excellent yields. The effect of the leaf-blister mite was to be seen on some of the older trees, but these were too far advanced to be seriously damaged. Some cotton planted at Bourkes in November was likely to be a useful experiment in late planting, and the results will be carefully watched.

Mr. Bovell reports that at Barbados 'the cotton all over the island is, so far as I know, with a few exceptions, in a healthy condition and practically free from insect pests.' In two cultivations the red maggot has appeared ; in these cases dead and dying branches are being carefully cut out.

West Indies.

Mr. C. M. Wolstenholme, of the firm of Wolstenholme & Holland, Liverpool, writing to the Liverpool *Mercury,* makes the following reference to cotton growing in the West Indies :—

In the West India Islands, which have been in a state of lethargy since the decline in the value of cane sugar, I can confidently say that we have established a most profitable industry on a sound commercial basis. The planters are enthusiastic, and a member of the association, who is a practical spinner, is now in Barbados with Sir Daniel Morris, the Imperial Commissioner of Agriculture, arranging final details. The West Indian crop this season promises to be 5,000 bales, worth £100,000, apart from a considerable quantity of indigenous cotton. Last season we marketed upwards of 2,000 bales of new growths, including the product of Sea Island seed, which sold up to 18*d.* per lb.; and Egyptian seed, which sold at the price of 'good fair' brown.

Cuba.

Mr. F. S. Earle, Director of the recently established Agricultural Department, Cuba, writes as follows to the *Havana Post* on cotton growing in that island :—

The planting of cotton is attracting considerable attention in Cuba at this time. The present indications are that the conditions here are all favourable for this crop with one important exception. Intending planters should be informed that the boll weevil exists in many parts of Cuba and that it is likely to prove exceedingly troublesome. It is not necessarily certain that the damage will be as great here as it has been in Texas, for the boll weevil is supposed to be a native of Cuba, and in many cases native insect pests have natural enemies of one kind or another that hold them more or less in check. It is when they migrate to other countries and succeed in leaving their enemies behind them that insects become more destructive. While there is thus reason to hope that natural enemies of the weevil exists here, none have so far been observed, and we can only conjecture what the effect on this insect will be of the rapid increase in its food supply that is now taking place in some parts of the island.

The best time for planting cotton in Cuba seems to be in May and June, so that the crop will mature during the dry season. It is almost impossible to harvest cotton that ripens during a period of frequent rains. Another point to be carefully considered by those intending to plant on a large scale is the matter of an adequate supply of labour for picking the crop. Cotton picking is a slow, laborious process at best, and with a scanty supply of unskilled labour it would be exceedingly difficult to harvest a large crop properly. It is by no means intended to discourage the planting of cotton in Cuba. The crop is on many accounts a most attractive one, but it would seem wise not to invest too heavily in it until its possibilities under our conditions are more thoroughly understood. This year's experience will probably demonstrate whether or not it can be profitably grown here.

GOAT RAISING IN MEXICO.

The following interesting account of goat raising in Mexico is taken from the U. S. *Monthly Consular Reports* for August :—

The ordinary domestic goat, so well known in the United States, is the species raised throughout Mexico. It is valued for its pelt, its tallow, and its flesh, both fresh and dried. As yet no use has been made of either horns or hoofs. In the vicinity of San Luis Potosi the entrails have been spun into long strings of so-called catgut, and the finer and more delicate strings have been profitably exported by mail, in small parcels, to Chicago and New York.

The Angora breed is not appreciated in Mexico, though it finds favour in western Texas, near the Mexican border. If of pure blood and if neglected during the season for pulling, it is apt to leave its hair scattered upon the scrub and brush. Furthermore, whether pure or crossed, it is more of a sheep than a goat, its skin being less than one fourth as valuable as ordinary goatskins. This destroys the value of the Angora in Mexico.

The ordinary goat, when slaughtered, yields 4 lb. of dried meat and 6 lb. of refined tallow, which, together with the skin, are worth here in the home market, in Mexican silver, $3·46 ($1·57 in gold)—the 4 lb. of dried meat, at 20c., 80c. ; the 6 lb. of refined tallow, at 16c., 96c. ; the cured skin, 2 lb., at 85c., $1·70. The original cost of goats for breeding purposes is, on an average, $2·50 a head in Mexican silver ($1·10 in gold). The common goat, well cared for, is hardy and well suited to the country. It breeds four times in three years.

The Profits of Goat Keeping.—The idea that a goat is an unprofitable and useless possession should be dispelled. A good goat will yield on an average, for the first three months she is in milk, 3 pints daily. During the next three months she will yield 1½ pints, and for the remaining ninety days ¾ pint daily. This brings the return from milk to 240 quarts, which, at 4*d.* per quart, is £4 from this source alone. Then there is the new-comer to be considered. If it be of good pedigree, healthy and well marked, it should fetch sufficient to pay all the expenses of the parent's keep, so that one goat may show a profit of £4 within the space of eight months. (*Agricultural World.*)

WEST INDIAN AGRICULTURAL CONFERENCE 1905.

The following is a revised list of the Representatives likely to be present at the Agricultural Conference to be held at Trinidad from January 4 to January 12 next.

President.

Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S., Imperial Commissioner of Agriculture for the West Indies.

Representatives.

JAMAICA.

The Director of Public Gardens and Plantations (the Hon. William Fawcett, B.Sc., F.L.S.). The Representative of the Board of Agriculture (the Hon. Henry Cork). The Representative of the Agricultural Society (J. R. Williams Esq., M.A.).

BRITISH GUIANA.

The Representative of the Board of Agriculture (the Hon. B. Howell Jones). The Superintendent of the Botanic Gardens (A. W. Bartlett Esq., B.A., B.Sc., F.L.S.). The Lecturer in Agriculture (E. W. F. English Esq., B.A.). The Assistant Instructor in Agriculture (J. E. Beckett Esq.).

TRINIDAD AND TOBAGO.

Representatives of the Trinidad Agricultural Society :—Peter Abel Esq. (Usine St. Madeleine), J. G. de Gannes Esq., and Edgar Tripp Esq., Secretary. The Government Analyst and Professor of Chemistry (Professor P. Carmody, F.I.C., F.C.S.). The Superintendent of the Royal Botanic Gardens (J. H. Hart Esq., F.L.S.). The Inspector of Schools (Mr. J. H. Collens). The Principal of Queen's Royal College (W. Burslem Esq., M.A.). The Principal of the College of the Immaculate Conception (the Rev. Father Neville).

Additional Representatives for Trinidad :—The Hon. G. Townsend Fenwick, C.M.G., and the Rev. Dr. Morton.

Representatives for Tobago :—The Hon. H. L. Thornton, T. L. M. Orde Esq., J.P., and the Curator of the Botanic Station, Tobago (Henry Millen Esq.).

WINDWARD ISLANDS.

Representative of the Grenada Agricultural Society (E. M. De Freitas Esq.). The Inspector of Schools, Grenada (J. A. Harbin Esq.).

Representatives of the St. Vincent Cotton Growers' Association (the Hon. Conrad J. Simmons and Edwin Richards Esq.). The Agricultural Superintendent, St. Vincent (W. N. Sands Esq.).

The Agricultural Instructor, St. Lucia (George S. Hudson Esq.).

BARBADOS.

Representatives of the Barbados Agricultural Society :—The Hon. Forster M. Alleyne, Vice-President, and G. Sebert Evelyn Esq. The Island Professor of Chemistry in chemical charge of Sugar-cane Experiments (Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S.). The Agricultural Superintendent of Sugar-cane Experiments (J. R. Bovell Esq., F.L.S., F.C.S.). The Head Master of Harrison College (Horace Deighton Esq., M.A., F.R.A.S.).

LEEWARD ISLANDS.

The Government Analytical Chemist and Superintendent of Agriculture (the Hon. Francis Watts, C.M.G., D.Sc., F.I.C., F.C.S.). Dr. H. A. Alford Nicholls, C.M.G., M.D., F.L.S., etc., Author of 'Tropical Agriculture,' Dominica. The Officer-in-charge of the Agricultural School, Dominica (Archibald Brooks Esq.). The Agricultural Superintendent, St. Kitt's-Nevis (F. R. Shepherd Esq.).

OFFICERS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

Imperial Commissioner of Agriculture for the West Indies (Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S.). Scientific Assistant (W. R. Buttenshaw Esq., M.A., B.Sc.). Mycologist and Agricultural Lecturer (L. Lewton-Brain Esq., B.A., F.L.S.). Entomologist (Henry A. Ballou Esq., B.Sc.).

Honorary Secretaries to the Conference—W. R. Buttenshaw Esq., M.A., B.Sc., and Alleyne Graham Howell Esq.

AGRICULTURAL SHOWS.

Forthcoming Shows.

Arrangements are being made by local committees for the holding of the following Shows under the auspices of the Imperial Department of Agriculture early next year :—

Dominica.—February 23, 1905.

Montserrat.—The Fifth Annual Show will be held in the Market Place on February 24, 1905.

Antigua.—February 25, 1905.

Nevis.—A show will be held at Charlestown on February 28, 1905.

Barbados.—The Local Industrial Exhibition and Show of Stock for Peasant Proprietors will be held at Dunscombe plantation, St. Thomas, on January 24, 1905.

Grenada.—February 1905.

St. Vincent.—It is proposed to hold an Agricultural Show in March next.

Barbados.

The Annual Agricultural and Industrial Exhibition of the Barbados Agricultural Society was held at Harrison College on December 20. Though the exhibits in some departments were not as numerous as in previous years, they were on the whole, however, up to the standard quality.

The Imperial Department of Agriculture offered three special prizes of $5 each, namely :—

For the best collection of fruit.

For the best collection of vegetables.

For the best exhibit of Sea Island cotton.

Also two prizes of $3 each, for kids the progeny of either the Anglo-Nubian billy 'Black Rock' or of the Toffenburg billy 'Bruce,' namely :—

For the best billy under twelve months old.

For the best native she-goat with kids from either of the above sires from two to six months old.

Diplomas of Merit of the Department were awarded for the following exhibits :—

Fancy Pigeons	... Mr. E. W. Williams.
Bunch Dwarf Bananas ...	... Mr. C. M. Austin.
Collection of Fruit ...	... Mrs. T. Clarke.
Sea Island Cotton ...	... Mr. H. M. Sisnett.
She-goat and three kids ...	... Mrs. T. Manning.

The stud goats 'Bruce' and 'Black Rock' were on show and attracted considerable attention.

As usual the good quality of the fruit, ground provisions, and vegetables was a striking feature of the exhibition.

CASSAVA POISONING.

The following correspondence in reference to cassava poisoning has been published in the Barbados *Official Gazette* of December 19, 1904:—

The Governor directs the publication for general information of the following correspondence with reference to a case of cassava poisoning which recently occurred in Barbados.

By command,

(Sgd.) S. W. KNAGGS,
Colonial Secretary.

Colonial Secretary, Barbados—to the Imperial Commissioner of Agriculture.

November 3, 1904.

Sir,

With reference to the previous correspondence on the subject of cassava poisoning, and to your letter No. B. 1,048 of March 27, 1903, I am directed by the Governor to forward to you the enclosed copy of a minute made by the Coroner of District 'A' on the proceedings at an inquiry into a recent death from that cause.

His Excellency will be glad to be favoured with your observations on the minute of Mr. Coroner Briggs.

I have, etc.,

(Sgd.) S. W. KNAGGS,
Colonial Secretary.

Note made by Mr. N. F. Briggs, Coroner, District 'A,' on the proceedings of an inquest into the cause of death of a boy, Theophilus Taylor—Verdict, 'Accidental Death'—Cause of death, 'Cassava Poisoning.' October 21, 1904.

NOTE:—It is frequently stated by witnesses when deaths occur from eating roasting cassava (always when not thoroughly cooked) that if roasting and poison cassava grow closely side by side, the roasting cassava takes up some of the poison from the poison cassava. Again, it is stated that the roasting cassava gets a 'spring in it' and that makes it poisonous. I notice in the *Hints and Information in regard to Cassava Poisoning*, * issued by the Imperial Department of Agriculture for the West Indies, that no allusion is made to these probably mistaken notions, and I would suggest that some authorized experiments might be carried out to test the truth or falsehood of this.

(Intld.) N. F. B.
October 28, 1904.

Imperial Commissioner of Agriculture—to the Colonial Secretary, Barbados.

December 12, 1904.

Sir,

I have the honour to acknowledge the receipt of your letter No. 1,586 of November 3 last, in which you enclose copy of a minute made by the Coroner of District 'A' on the proceedings at an inquiry into a recent death from cassava poisoning.

In reply to the request contained in the 2nd. paragraph of your letter under reply, I may mention that I have given careful consideration to the minute made by Mr. Briggs. There are apparently no grounds for the supposition 'that if roasting and poison cassava grow closely side by side the roasting cassava takes up some of the poison from the poisonous cassava.' There can be no direct connexion between the two plants, and it is impossible that the poison can pass through the soil from the poisonous cassava to the sweet.

It is well known, as the result of actual experiment, that if roasting cassava is planted under favourable conditions the amount of prussic acid contained in the roots may be increased. For instance, an experienced planter at Jamaica states: 'The soil has a great effect on cassava. I have seen sweet cassava turn quite bitter in some lands, the variety called "Mexico" being especially apt to change in this way.'

The second point noticed by Mr. Briggs is that the roasting cassava gets a 'spring in it' and that makes it poisonous. If by the 'spring in it' is meant that the plant starts into second growth after heavy rain, it is probable that certain changes may take place inducing an increase of the poisonous quality.

What probably happens when persons die from eating sweet or roasting cassava is that it is either too old or it has been removed from the fire before the whole of the acid has been driven off; in consequence it produces symptoms of poisoning more or less acute according to the amount of cooking it has received. Usually those who die from cassava poisoning in this island are ill-fed and neglected children. This class is most difficult to reach, and I can only suggest that the sympathy and co-operation of all who are in a position to bring the necessary information within reach of those concerned may be fully enlisted. This was the object of the Leaflet No. 7 recently published by this Department. Several thousand copies of this leaflet were distributed in Barbados and other parts of the West Indies.

The important point to dwell upon is that sweet or roasting cassava is only really wholesome when the roots are not too old and when they have been cooked until they are quite soft. If the exterior portion only is soft and the centre is hard, the probability is that the latter is more or less poisonous and should not be eaten. Further, it is important to bear in mind that cassava after it has become cold, or is allowed to stand for some time after it is cooked, may become unwholesome and not fit to eat unless it is cooked a second time.

I suggest that it might be useful if a copy of your letter and enclosure and also of this letter were published in the *Official Gazette* and that slips be struck off and distributed through the Educational Department to all the schools in the colony.

I have, etc.,

(Sgd.) D. MORRIS,
Commissioner of Agriculture.

Copy of a minute by the Governor.

Hon. Colonial Secretary.

Correspondence to be published and my obligation expressed to the Commissioner.

The great point to emphasize in this matter is *thorough* cooking. This is well understood in West Africa where large quantities are consumed and its poisonous properties under certain conditions well understood.

(Intld.) G. T. C.
December 12, 1904.

*A copy of the Leaflet (No. 7) on Cassava Poisoning published by the Imperial Department of Agriculture, which also contains hints as to the immediate treatment of sufferers until medical aid is available, may be obtained *free* on application to the Imperial Commissioner of Agriculture, Head Office, Barbados.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 431 of this issue.

The *Agricultural News:* Price 1*d.* per number, post free 1½*d.* Annual subscription payable to Agents, 2*s.* 2*d.* Post free, 3*s.* 3*d.*

Agricultural News

Vol. III. SATURDAY, DECEMBER 31, 1904. No. 71.

NOTES AND COMMENTS.

Contents of Present Issue.

The present state of the cotton market is briefly reviewed in the editorial to the present issue. The position of Sea Island cotton has been but slightly, if at all, affected by the considerable decline that has recently been brought about in the price of Upland cotton by the great increase in production.

The position of West Indian sugar in the New York, Halifax, and London markets is clearly stated in the memorandum published on p. 419.

On p. 420 will be found a note on the shipment of bananas from Barbados, and also an interesting extract from the Annual Report of the Director of Public Gardens in Jamaica on the hybridization of pine-apples.

Extracts from fortnightly reports on the condition of the cotton cultivations in the various islands are to be found on p. 421. A further note in reference to this industry deals with experiments that are being conducted in Cuba.

Official correspondence in regard to Cassava Poisoning is published on p. 423.

The insect notes in this issue refer to cotton pests at Barbados and a butterfly borer that has been doing considerable damage to canes in British Guiana.

An interesting description of the Lotus Lily is given on p. 427. On the same page will be found a report on a Jamaica sample of banana meal.

West Indian Agricultural Conference.

We publish on p. 422 a revised list of the Representatives who are likely to attend the Agricultural Conference that is to be held at Trinidad during the next fortnight.

Several additional Representatives have been appointed since the publication of the provisional list published in the last issue of the *Agricultural News.* We regret that a number of gentlemen, who it was hoped would be present, have found it impossible to attend.

Ground Nuts as a Green Manure.

In a recent lecture before the Kandy Planters Association, Mr. Herbert Wright, Controller of the Experiment Station at Gangaroowa, Ceylon, dealt with the subject of green manures for tea, cacao, rubber, and cocoa-nuts. Special reference was made to the use of ground nuts for this purpose.

The varieties recommended by Mr. Wright—known as the Tanjore and the Pondicherry—produce minimum crops of nuts and a maximum of leafy growth. The actual amount of woody tissue is very small and practically confined to the roots. Within five months 4,340 lb. of fresh, green material can be obtained, without allowing for the large amount of leaf falling to the ground. This plant has been cultivated as a green manure and for crop purposes on young clearings of rubber and cocoa-nuts, the green material being buried as soon as the nuts have been picked. There seems to be every possibility of being able to use this crop in this way, thereby clearing the cost of upkeep of new clearings in certain districts.

Cotton Experts in Jamaica.

A very successful conference, arranged by the Board of Agriculture to meet the Cotton Experts, Messrs. Oliver and Stancliffe, took place at Kingston, Jamaica, on November 29. The Chairman of the Board (the Hon. H. Clarence Bourne) presided, his Excellency the Governor being also present.

In the course of his address Mr. Oliver referred to the cultivation of Egyptian cotton. There was, he said, an unlimited demand for this class of cotton, but whether it would pay them to grow it he did not know. They would not receive for Egyptian cotton more than half what they would receive for good cotton grown from such seed as the Imperial Department of Agriculture secured from Mr. E. L. Rivers' estate last year. An important point he desired to bring home to them was that if they grew Egyptian cotton they should confine it to a certain area, as it was most essential that different kinds of cotton should be kept absolutely distinct. Mr. Oliver dealt also with the subjects of picking, ginning, and baling.

It may be mentioned that Mr. Oliver has expressed himself as being very pleased with some of the cotton cultivations he has seen in Jamaica. He visited one estate where 50 acres of cotton were being grown and said he had seen no better cultivation since he had left Barbados.

Cassava Poisoning.

We publish on p. 423 interesting correspondence on the subject of cassava poisoning. The correspondence was the result of a note by the Coroner at a recent inquest in Barbados where cassava poisoning was the cause of death.

It would appear that there are various mistaken notions regarding the cassava plant more or less commonly held by the peasantry in Barbados, while the same class of people is not fully impressed by the precautions that are necessary in preparing cassava for eating. The points of importance in this connexion are clearly dealt with in the letter of the Imperial Commissioner of Agriculture.

Plants as Analytical Agents.

In a paper read before the recent British Association meeting at Cambridge, Mr. A. D. Hall, M.A., referred to the attempts that have been made from time to time to use the living plant as an analytical agent for discovering the manurial requirements of a soil. To try the agreement between the method of using plant ashes, to ascertain the needs of the soil, and chemical analysis, experiments were begun in 1902 with oats grown in pots containing soils of very different types. Although in certain cases both methods agreed in their results, there was no strict measure of consistency between the two sets of figures.

Experiments were also tried with root crops. The results indicated that the analysis of the ash of the Swede plant would often provide a better indication of the phosphoric acid requirements of the soil than the analysis of the soil itself, while, similarly, the mangel plant will serve to test the state of the soil as to potash. It will be necessary to obtain further data before this method can be employed for practically testing the soil.

Great Britain's Orange Supply.

The Liverpool *Courier* of November 23 has an interesting article on the orange supply of Great Britain. It is stated that about 6,000,000 cases of oranges are landed every year; nearly four-fifths of these are imported from Spain, the province of Valencia being responsible for the greater part. In return, Great Britain pays Valencia at least about £6,000,000 a year. The thinness of the peel and the richness of the flavour of Valencia oranges enable them to vie successfully with those of Florida and even California. Paris is Great Britain's keenest competitor for these oranges, where extravagant prices are paid.

The old method of crowding a large number of oranges of all shapes and sizes in rough and clumsy-looking packages has been abandoned, and the fruit now undergoes systematic treatment through its long pilgrimage. It is carefully picked, and conveyed in padded carts to well-ventilated warehouses, where it is allowed to sweat. The oranges are then carefully graded and wrapped in tissue paper before being packed in scientifically ventilated cases. The treatment on board ship also ensures the best possible ventilation.

Shade-grown Tobacco in Jamaica.

Reference has several times been made in these columns to the experiments that have been carried on in Jamaica for the purpose of testing the possibility of producing, locally, the expensive, imported wrapper tobacco. It will be remembered that Mr. F. V. Chalmers, who recently visited Jamaica in connexion with the tobacco industry, reported: 'The product has every appearance when perfected of being a type of tobacco which is hardly likely, for the purpose of cigar manufacturing, principally from a wrapper point of view, to be excelled by any other tobacco of the world, and from the estimate prepared by the Hon. Wm. Fawcett of the cost of such production, in my opinion, a very lucrative industry should arise in Jamaica.' (See *Agricultural News*, Vol. III, p. 379.)

Further reference is made to these experiments in the *Bulletin of the Department of Agriculture*, Jamaica, for December, from which we learn that the cost of production per pound of tobacco (calculating on the wood-work to last for five years, and putting on new cloth each year) is estimated to be about 2*s.* 1*d.* This estimate assumes a yield (a low average) of 800 lb. per acre.

It is stated that it appears to be 'safe to advocate the cultivation of this valuable crop only in such districts as Upper Clarendon and Temple Hall.'

Rubber-tree Planting in Para.

The United States *Monthly Consular Reports* for June contains an interesting article on 'Rubber-tree planting in Para.' It is stated that there can be little doubt that the Para rubber trees (*Hevea brasiliensis*) of the great Amazon Valley will ultimately be exhausted. Experiments tried in various parts of the world to see if artificial plantations could not be established have been measurably successful. The principal difficulty has always been that of transporting the seeds, which very soon lose their power of germination.

The ideal place to try such experiments would seem to be in the natural home of the tree, but little has been done in this way. Considerable interest is therefore attached to the experiments of a Mr. Martins, who some years ago cleared a space and planted a large number of Para rubber seeds on his estate, Da Fundo. These sprang up and flourished in such a way that Mr. Martins continued the experiment. This spring he tapped, for the first time, some forty trees. His success was complete and undoubted. There are now several hundred trees that are beginning to yield latex. There are between 2,000 and 3,000 young plants from 2 to 20 feet high. It is estimated that in a space of 5 acres 'there will be, ten years from now, at least 1,000 full-bearing trees, and they will produce more and better rubber than the trees on ten forest "runs" (the usual "run" being 2 miles long), for it will be gathered more quickly, in a more cleanly manner, and with greater care of the tree in tapping.' Trees can profitably be planted as close as 6 to 8 feet apart each way, giving easily 800 trees to the acre.

INSECT NOTES.

Cotton Insects in Barbados.

In November and December 1903 cotton in Barbados was very seriously attacked by the cotton worm, and many fields were completely defoliated. This year there has been but little evidence of such attacks. A few estates have reported the appearance of the worm, but the prompt application of Paris green has been efficient in killing them before any damage had been done. In a few instances, managers have delayed the application of poisons for a day or two, and in such cases some plants have been more or less stripped of their leaves.

The cotton stainer has not been reported as doing any damage, but the cotton aphis has been present in large numbers in a few fields. The lady-birds, however, have been very numerous and probably no damage has been done.

The red maggot has made its appearance but only in a few places, and then only in small numbers. Attacked stems and branches have been cut out and burned and no serious damage is expected from this cause.

In one field a small number of bolls have been attacked by a caterpillar that eats into the inside and destroys the young seed and fibre in exactly the same way that the boll worm attacks the cotton. This field is near the spot where a small plot of corn was last year destroyed by a worm, and it is likely that this is the same species, though it has not yet been identified.

New Cane Pest in British Guiana.

In October last specimens of a butterfly borer were received from Mr. G. N. Bethune, of Plantation Enmore, British Guiana, which was reported to be causing considerable damage to the canes. More recently, the British Guiana Board of Agriculture has sent additional specimens with reports by the Executive Secretary and the Agricultural Assistant. The following brief description of this pest and the damage caused by it is likely to be of interest:—

The adult of the borer is a large butterfly, with a spread of about 3 inches, dark brownish-grey above, light-grey beneath. The head is large, with large, prominent, dark-brown eyes. The antennae are about $\frac{11}{16}$ inch in length, slender, swollen towards the tip, the extreme tip being a fine, slightly curved point. The colour of the antennae is dark-brown, lighter at the tip. The fore wing is crossed by a white band from within the middle of the front margin to the hinder angle, with a shorter white band outside it and nearly parallel to it. The hind wing has a white band, which begins with two spots at the front margin and extends back across the wing, increasing in width, so that it is widest near the hind margin. The hind wing also has six pale-orange spots along the margin.

The egg is about $\frac{1}{6}$ inch in length, pointed at each end, with five prominent ribs running from end to end. The colour ranges from a light grey to a dark grey. In captivity the eggs are laid singly, and not attached.

The full-grown larva is about $2\frac{1}{2}$ inches long and $\frac{1}{2}$ inch in diameter at the widest point, which is just behind the head. The colour is a cream white, head light-brown with black mandibles. The young larva enters the cane near the ground, and tunnels a short distance up in the cane and then goes into the underground portion of the stool. Mr. Robert Ward, Agricultural Assistant, states that the cocoon is in the underground portion of the canes. Larvae in captivity at the Head Office of the Imperial Department of Agriculture tunnelled through the ground and one at least built a cocoon or earth cell in the soil. It is supposed that the adult emerges by means of the tunnels in the cane stumps, but it has not yet been proved whether it has any other way of getting above ground. This condition has suggested the plugging of the holes in the cane stumps with wet clay, which is being tried and some success has been reported. Mr. Bethune reported that he was catching about 1,000 butterflies daily, with nets, in the hands of children.

The damage to the cane by this pest is twofold; the riper cane is severely injured by the large tunnel extending through about 2 feet of the basal portion, and the stumps are so thoroughly eaten out underground as to make it impossible to ratoon them. It is hoped that a better knowledge of the life-history and habits of this pest will make it possible to apply remedies to prevent serious damage to canes in British Guiana in future years.

KAPOK AND ITS USES.

The following account of kapok and its uses is taken from *Chambers' Journal*:—

Every year that busy centre of commerce, Amsterdam, receives nearly 1,000 lb. of a curious and interesting vegetable substance known in Java and in the trade as kapok, which is found very useful for stuffing cheap mattresses and pillows, among other purposes. It is a sort of yellow wadding which nature uses as a covering for the seeds of certain trees in the Malaccas. Its fibres being very non-resisting, it has been found impossible to spin or weave it, but it gives excellent results for bedding, making a mattress delightfully soft if it is exposed to the sun before being used. It is exceedingly light and buoyant, in this respect greatly surpassing cork, as it will support in the water thirty-five times its own weight. The tree whence it is derived (*Eriodendron*) grows rapidly, and in the second year is 12 to 15 feet high, but it does not fruit abundantly until the fourth year. Like the cotton plant, it bestows two gifts on man, the special wadding mentioned, which lines the husk, and the oil extracted from the seeds, which is used especially in the Chinese markets. The threads of the soft fibre taken from the pods are light-yellow, rather silky, and only about an inch in length. They are made into thin rings. Kapok, it is said, never decays. Among the ever-increasing uses to which this curious vegetable product is put—causing the culture of the Eriodendron to make great strides in the Dutch Indies, while efforts are being made to cultivate it in similar climates—it has been suggested that excellent life-saving apparatus might be made from it, which should be in the form of mattresses and cushions, easily obtainable in moments of danger. Three hundred grammes of kapok ($10\frac{1}{2}$ oz.) will support a man of 10 stone 5 lb. (145 lb.) in the water; and experiments by a French society with articles made of this wadding, which had previously been soaked in water for eighteen hours, gave excellent results. One small mattress supported several men. It is probable that soon all ships' beds will be made of kapok.

SCIENCE NOTE.

The Lotus Lily.

The sacred lotus of the ancient Egyptians is known botanically as *Nelumbium speciosum*; the other species of this genus (*N. luteum*) is a native of North America and Jamaica and is shown in fig. 16. These plants are fairly common in cultivation in the West Indies. They belong to the natural order *Nymphaeaceae*, to which also belong the English water-lilies and the giant water-lily of the Amazon (*Victoria regia*).

Both species of Nelumbium are water, or rather marsh, plants; the flowers and leaves project above the surface of the water. The large leaves are peltate, that is, the leaf-stalk is attached to the centre of the almost circular blade; the leaf-blade is covered by a fine microscopic down, which by retaining a film of air over the upper surface prevents this from being wetted; when water is poured on it simply rolls off in drops. As in many water and marsh plants the leaf-stalks and the long flower-stalks contain large air spaces which connect with the breathing pores and are useful in respiration.

Fig. 16. Nelumbium luteum.
[From *Dictionary of Gardening*.]

The petals and stamens are both numerous, they are not arranged in whorls but form a close spiral. In the centre of the flower is the curious pistil, shaped like an inverted cone. It consists of a number of carpels which are embedded separately in the top of the swollen receptacle. This receptacle becomes very dry and light, and the true fruits, which are one-seeded, small and dry (achenes), separate from it as they ripen. It breaks off bodily from the stalk and floats about until decay sets in; the fruits are in this way liberated and settle down to the bottom of the pond, where germination takes place.

Nelumbium speciosum is now found throughout India, China, Japan, Persia, Australia, etc.; it no longer occurs on the Nile. Sculptures of it are very frequent in Egyptian temples, and it is still regarded as sacred in India, Tibet, and China. The seeds of this species are used as food in Cashmere and China.

A reference to the occurrence of *N. speciosum* in Antigua, where it was establishing itself in a wild state, is made in Volume I of the *Agricultural News* (p. 104).

BANANA MEAL AND FARINE.

In a report by the United States Consul-General at Halifax, recently reproduced in the *Agricultural News* (p. 397), it was mentioned that inquiries had been made for banana flour. The November issue of the *Journal of the Jamaica Agricultural Society* contains an article by Mr. H. H. Cousins on local products that might be used instead of imported cornmeal. The following analysis and report are given with regard to a locally prepared sample of banana meal:—

Moisture	10·88	per cent.
Albuminoids *	0·71	,,
Fats and oils	0·22	,,
Sugar	3·48	,,
Starch	60·42	,,
Pectin	20·93	,,
Fibre	0·72	,,
Mineral matter	2·64	,,
* Containing nitrogen ...	01·14	

From the chemical composition of this banana flour it is clear that practically the whole of it is readily digestible. The mineral matter contains soluble phosphates such as occur in wheaten flour. This flour consists almost entirely of carbohydrates of a readily digestible nature. The high proportion of pectin imparts to it the mucilaginous properties of a fruit extract. I consider it a well-prepared article of high dietetic value.

In regard to the farine, Mr. Cousins states:—

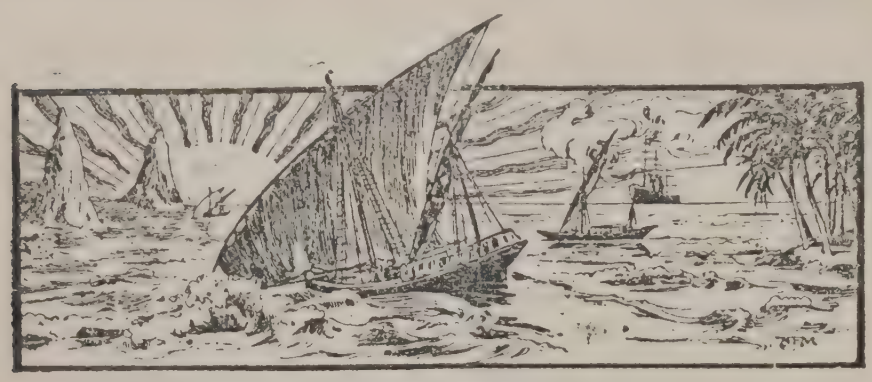
Farine should be of high dietetic value when used in conjunction with more nitrogenous foods like eggs, fish, peas and beans. For production of work, and general maintenance, 11 lb. of farine are equal to 10 lb. cornmeal.

There are also other products which can be made into meal for storing, but the two mentioned, farine and banana meal, will likely prove the most useful. We ought to have at least some supplies of local cornmeal, and Mr. J. H. Levy, of the Jamaican Products Company, Brown's Town, has put in machinery for the purpose of making cornmeal from Jamaica grown corn, and is open to buy all the corn he can get at a fair price. Sweet potato meal is also a most useful form of storing farinaceous food.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture and the scientific staff of the Imperial Department of Agriculture will be at Trinidad from January 3 to 13, 1905.

The Secretary of State for the Colonies has been pleased to appoint Mr. Thomas Thornton, an Associate of the Royal College of Science, to be a Travelling Instructor in connexion with the cotton industry under the Imperial Department of Agriculture in the West Indies.



GLEANINGS.

It has been decided to hold the annual Teachers' Agricultural Course in Jamaica from January 2 to 25, 1905.

It is a coincidence that the new Governor of Barbados (Sir Gilbert Carter, K.C.M.G.), and the new Governor of Martinique (M. Bonhoure) are both keen entomologists.

St. Vincent honey can be obtained from Messrs. Leonard Hall & Co., 132, Queen Victoria Street, London, E.C., in cases of six 1-lb. jars, carriage paid, for 5*s.* per case.

The Montserrat Agricultural Society is making arrangements for holding an Agricultural Show at St. George's Schoolroom on Easter Monday, April 24, 1905.

As an indication of the confidence in the future prospects of the sugar industry in Barbados, it may be mentioned that on December 9, no less than six plantations were sold at the Master-in-Chancery's office.

It may be useful to mention that bags for baling Sea Island cotton may be obtained from Messrs. Henry Knuck & Co., Whitehall Works, Dundee. Their cost, c. i. f. Barbados, is 2*s.* 9*d.* each, less 2½ per cent.

Mr. Henry Millen writes that there is at the Botanic Station, Tobago, a mango tree in fruit for the second time this season. The fruits are of average size and good flavour. It is most unusual to have mangos in fruit in December.

No. 3 of the *West Indian Bulletin* (Vol. V) is now in the press and will be issued shortly. The succeeding number will contain the official report of the proceedings of the fifth West Indian Agricultural Conference.

According to the *Hawaiian Forester and Agriculturist*, the Hawaiian Sisal Co. estimates the future cost of producing a ton of sisal hemp and delivering it in San Francisco at $74. At the latest New York quotation of $165 per ton, it is evident that there are prospects of excellent profits.

It is announced in the *Journal of the Jamaica Agricultural Society* that a firm in Kingston is in want of a consignment of 5 or 10 tons of bird peppers for which they offer 21*s.* per cwt. This is a product that might easily be raised by small settlers.

During the past fortnight 512 bales of West Indian cotton were imported into the United Kingdom. Sales have been effected in Liverpool at the following prices: West India, 4·75*d.* to 5·20*d.* per lb.; West India Sea Island, unchanged; medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* (*West India Committee Circular*, December 6.)

According to the *Board of Trade Journal*, the Syndicate of Sugar Manufacturers, Java, offers prizes to the inventors of the best apparatus for automatically registering the weight of sugar-cane juice in lots of not less than 1,000 kilos.

The notes on 'Rabbit Keeping in the West Indies' by Mr. John Barclay, Secretary of the Jamaica Agricultural Society, which recently appeared in the columns of the *Agricultural News*, will shortly be published in pamphlet form.

It is far more difficult to keep poultry in wet districts than in dry districts. This refers especially to turkeys which are very difficult to keep in wet districts. Guinea fowls also thrive best in dry districts. Ducks are much easier kept in wet districts. (*Journal of the Jamaica Agricultural Society.*)

The West India Committee's Antigua correspondent writes in reference to the visit of the Cotton Experts as follows: 'The general result has been to leave the planters with much clearer and more definite ideas as to improving the quality of cotton, and these should make themselves felt when the next picking season comes round.'

His Majesty the King has thanked the Dominica Agricultural Society for offering for the use of the hospitals, the fruit which gained a gold medal at the recent Fruit Exhibition of the Royal Horticultural Society, and suggested that it should be sent to the Great Ormond Street Hospital for Children.

During the quarter ended September 30, 1904, 393 bales and 2 bags of cotton were exported from the British West Indies. The total weight was 119,052 lb., and the estimated value £5,603. Particulars as to the exports of cotton for the previous quarter were given in the *Agricultural News*, Vol. III, p. 316.

Under the power given by the Jamaica Rum Protection Law, the Governor has appointed Mr. J. C. Nolan to be the person who is empowered to institute proceedings and undertake the prosecution in the United Kingdom and Ireland and elsewhere of offences under the Merchandise Marks Acts, so far as such Acts apply to Jamaica rum, and to take all necessary steps for protecting Jamaica rums from imitations and frauds. (*Gleaner*, December 7, 1904.)

A correspondent writes to *The Times* that, having to live in a town in Brazil where no mosquito nets were procurable, he could get no rest on account of the assaults of mosquitos until he hit on the simple expedient of anointing the face with kerosene oil and soap in the proportion of about a teaspoonful of oil to a lather of soap and water, which, when free from bubbles, would fill one-third of a soap dish. No injury was done by this mixture to the skin.

According to the *British Medical Journal*, bananas are in the best condition for eating when 'they are so ripe that the skins show dark spots.' Usually in Europe, and to some extent in the United States and Canada, bananas are eaten when quite hard and the skin slightly tinged with yellow. This is a mistake. In consequence the banana is not so easily digested and is not so extensively used as it deserves to be. In the West Indies, bananas as a dessert fruit are only eaten when sweet and pulpy. They are then delicious and wholesome.

ANNATTO.

The *Agricultural Ledger*, 1904—No. 12, is devoted to a review of existing information as to the annatto plant and its dye. The following extracts are likely to be of interest :—

Annatto or arnatto is a dye obtained from the coating of the seed of an American shrub or small tree known as *Bixa orellana*. It is a plant easily cultivated, is not very exacting in the matter of soil, and has been taken to nearly every country of the tropics. The flowers are showy, sometimes white, sometimes pink ; and often it is grown as an ornamental plant in gardens. The plant grows to a height of 12 to 15 feet. The leaves are heart-shaped, sharp at the end. The flowers are borne at the ends of the branches in a loose bunch and are large, regular and showy. The pods are rather urn-shaped in general outline, laterally compressed and slightly beaked above ; they are covered with weak prickles. At full maturity they crack open from the beak downwards, along the two edges and expose the seeds. The annatto harvest begins when two or three of the pods of a bunch are gaping slightly : then is the time to cut off the whole and to take them to any suitable place for shelling out the seeds. These seeds are either dried carefully in the sun and sent into the market as they are, or else the dye is prepared from them by one of the processes to be described.

CULTIVATION.

The cultivation of Bixa is very simple, and the bush has few enemies. The first return comes in the second year. Seeds from which the dye may have been washed are sown at the beginning of the rains about 7 to 8 feet apart in prepared soil. Two or three seeds may be put into each hole, and ultimately the weaker seedings eliminated, or else the seedlings may be grown in a nursery and planted out at the distance named. On the fattest lands the intermediate plants may ultimately have to be removed, so that the bushes may stand 15 feet apart. As the young plants come up a little shade is given either by placing large leaves over them to protect them during the heat of the day, or by putting mats over them. When they are a foot high they may be considered to be established and need no further shade. Weeding is necessary until by their own growth they so cover the ground as to keep weeds down. Pruning is desirable to make the plant bushy ; for the flowers are borne on the ends of the branches.

Annatto plants make good hedges and may be used for wind-breaks for other kinds of cultivation.

YIELD.

The yield per acre is set down at 6½ to 7½ maunds * of seeds, and as 9 to 10 seers of seed will give one seer of the prepared dye, it is 26 to 30 seers of dye. The first full crop may be set down at 5 cwt. (4 mds.) of seed per acre ; the subsequent crops increasing.

The markets for it now are chiefly in Europe and North America, and the chief countries supplying it are Brazil, French Guiana or Cayenne, the French West Indies, and, to a less extent, the British West Indies. Ceylon and Madras also send a small quantity of seed to Europe. The annatto of Cayenne obtains the highest price, and in France it may, sold in bulk, touch at times 200 francs per 100 kilos. The less valuable kinds sell at much lower prices, down even to 30 francs per 100 kilos. An average price in Germany seems to be about 80 marks per 100 kilos. [About £2 per cwt.]

PREPARATION.

The preparation of annatto in any form is quite a simple one. The better stuff is made in the following way :—

The seeds, taken out of the capsules, are placed in a receptacle, and hot water is poured over them until they are well covered : they are then stirred for a considerable time until the colouring matter has been washed off. That done, the liquor and seeds are separated by straining through any suitable material. The former carries with it all that is of value, and is set to stand so that the dye may fall to the bottom ; the latter are thrown away. When all the dye has settled, the supernatant water is poured off as far as possible, and the fine residue placed in the shade where the rest of the water may evaporate without the aid of artificial heat. As soon as the mass is dry enough to be kneaded, it is moulded by hand into rolls or cakes and these are put by until they are perfectly hard. When moulded they are wrapped in clean leaves, plantain or banana, and when dry they are packed in layers in boxes.

* One maund = 40 seers = 9·8 gallons. [Ed. *A. N.*]

COCO-DE-MER.

In his report on the Botanic Station in Seychelles for 1903, Mr. R. Dupont, the Curator, makes the following reference to the interesting double cocoa-nuts known as 'coco-de-mer' (*Lodoicea sechellarum*):—

The exportation of double cocoa-nuts from Seychelles reaches about 300 per annum. These curious fruits are principally exported to India. They should be made known much more in Java, Malay Peninsula, China, Philippines, Australia, Cuba, etc., where they could be employed in sugar factories for the extraction of sugar from the centrifugals. By cutting the two lobes lengthwise, a nut can be made to produce two very large bowls, each capable of containing 5 lb. to 10 lb. of sugar. These bowls are extensively used in Mauritius for this purpose and cannot be replaced by metallic vessels which injure the copper wire of the centrifugals or are soon oxidized. The coco-de-mer bowl is besides extremely light and durable.

The nuts also contain a very hard kernel which has been sent home for report as to the possibility of using it as are the other vegetable ivory-like substances in different manufactories. It is difficult to find a bigger mass of vegetable ivory than the one which is contained in the coco-de-mer nut.

It might be mentioned that some of these nuts were obtained from Seychelles for the Botanic Station at Dominica. Mr. Jones stated in his report for 1903-4 that two of the four seeds were growing nicely.

Technical Education in Agriculture. In an article in the U.S. *Monthly Consular Reports* on 'Technical Education, the basis of German Industrial Progress,' the Consul-General at Berlin makes the following reference to agricultural education : 'The careful analyses of soils and the skilful use of chemical and other fertilizers to meet exactly the deficit in essential elements have revolutionized agriculture in this country. It is due largely to the work of expert chemists that the percentage of saccharine content in sugar beets has been raised from 5·72 per cent. in 1840, to 13 per cent. in recent years, whereby the whole German sugar industry was saved from collapse.'

MARKET REPORTS.

London,—December 6, 1904. Messrs. J. Hales Caird & Co., Messrs. Kearton, Piper & Co., Messrs. E. A. de Pass & Co., 'The West India Committee Circular'; 'The Liverpool Cotton Association Weekly Circular,' December 2; and 'The Public Ledger,' December 3, 1904.

Aloes—Barbados, 15/- to 35/-; Curaçoa, 15/- to 37/6 per cwt.
Arrowroot—St. Vincent, 1¾*d.* per lb.
Balata—Block, 1/3 to 1/3½ per lb.
Bees'-wax—£7 2*s.* 6*d.* to £7 7*s.* 6*d.* per cwt.
Cacao—Trinidad, 56/- to 65/- per cwt.; Grenada, 53/- to 57/- per cwt.; Dominica, 50/- to 52/- per cwt.; Jamaica, 48/- to 55/- per cwt.
Cardamoms—Mysore, 7½*d.* to 2/- per lb.
Coffee—Jamaica, good ordinary, 37/- to 38/- per cwt.
Cotton—West Indian Sea Island, medium fine, 12½*d.*; fine, 13½*d.*; extra fine, 15½*d.* per lb.
Fruit—
Bananas—No quotations.
Grape Fruit—6/- to 7/- per case.
Oranges—8/- to 11/- per box of 150-176.
Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, fair bright, 37/-; ordinary to good ordinary, 27/- to 30/- per cwt.
Honey—Jamaica, 17/6 to 22/- per cwt.
Isinglass—West Indian lump, 2/5 to 2/8; cake, 1/3 per lb.
Kola Nuts—4*d.* to 6*d.* per lb.
Lime Juice—Raw, 9*d.* to 1/- per gallon; concentrated, £13 15*s.* per cask of 108 gallons.
Lime Oil—Distilled, 1/3 per lb.; hand-pressed, 2/6 to 2/9 per lb.
Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.
Mace—Bold pale, 1/6; red, 1/1 to 1/2; broken, 1/- to 1/1 per lb.
Nitrate of Soda—Agricultural, £11 per ton.
Nutmegs—55's, 3/-; 61's, 1/9; 82's, 1/-; 140's, 5*d.* per lb.
Pimento—2½*d.* per lb.
Rum—Demerara, 10*d.* per proof gallon; Jamaica, 1*s.* 9*d.* per proof gallon.
Sarsaparilla—7½*d.* to 1/2 per lb.
Sugar—Yellow crystals, 20/ to 23/- per cwt.; Muscovado, Barbados, 16/- to 17/- per cwt.; Molasses, 14/6 to 17/- per cwt.
Sulphate of Ammonia—£13 5*s.* per ton.

Montreal,—November 9, 1904.—Mr. J. Russell Murray. (In bond quotations, c. & f.)

Bananas—Jamaica, 50c. to 75c. per bunch of 8 hands; $1·00 per bunch 'firsts'; $1·30 to $1·40 per bunch 'jumbos.'
Cedar—Trinidad, 40c. per cubic foot.
Cocoa-nuts—Jamaica, $26·00 to $28·00; Trinidad, $22·00 to $24·00 per M.
Coffee—Jamaica, medium, 9c. to 10c. per lb.
Ginger—Jamaica, unbleached, 6¾c. to 8c. per lb.
Molascuit—Demerara, $1·32 per 100 lb.
Molasses—Barbados, 25c. to 27c.; Antigua, 21c. per Imperial gallon.
Nutmegs—Grenada, 110's, 20c. to 20½c. per lb.
Oranges—Jamaica, $3·60 per barrel; Dominica, $3·75 per barrel: $1·75 per box (duty paid).
Pimento—Jamaica, 5½c. to 6c. per lb.
Pine-apples—No quotations.
Sugar—Grey Crystals, 96°, $2·90 to $3·00 per 100 lb.
—Muscovados, 89°, $2·75 to $2·80 per 100 lb.
—Molasses, 89°, $2·50 to $2·60 per 100 lb.
—Barbados, 89°, $2·60 to $2·75 per 100 lb.

New York,—December 9, 1904.—Messrs. Gillespie Bros. & Co.

Cacao—Caracas, 12c. to 13c.; Grenada, 11¼c. to 11½c.; Trinidad, 12c. to 13¾c. per lb.
Cocoa-nuts—Trinidads, $25·00 to $27·00 per M., selected; Jamaicas, $27·00 to $28·00 per M.
Coffee—Jamaica, good ordinary, 8¾c. to 9c. per lb.
Goat Skins—Jamaicas, 58c. to 60c. per lb.
Grape Fruit—Jamaicas, $2·50 to $3·00 per barrel.
Oranges—Jamaica, $3·50 per barrel (stem cut).
Pimento—4⅝c. per lb.
Sugar—Centrifugals, 96°, 4¾c.; Muscovados, 89°, 4¼c.; Molasses, 89°, 4c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 17, 1904.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·40 to $3·75 per 100 lb.
Cacao—Dominica, $11·25 per 100 lb.
Cocoa-nuts—$9·00 per M. for husked nuts.
Coffee—$10·00 to $12·00 per 100 lb.
Hay—90c. to 95c. per 100 lb.
Manures—Nitrate of soda, $60·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $72·00 to $75·00; Sulphate of potash, $67·00.
Onions—Madeira (stringed), $2·50 to $3·50 per 100 lb. (retail).
Potatos, English—$1·75 to $2·25 per 160 lb.
Rice—Ballam, $4·80 to $4·85 per bag (190 lb.); Patna, $3·25 per 100 lb.

British Guiana,—December 15, 1904.—Messrs. Wieting & Richter.

Arrowroot—St. Vincent, $7·50 to $8·00 per barrel.
Balata—Venezuela block, 25c.; Demerara sheet, 35c. per lb.
Cacao—Native, 12c. to 13c. per lb.
Cassava Starch—$6·00 to $6·50 per barrel.
Cocoa-nuts—$10·00 to $12·00 per M.
Coffee—Rio and Jamaica, 14c. per lb. (retail).
—Creole, 11c. per lb.
Dhal—$4·30 to $4·40 per bag of 168 lb.
Eddoes—$1·68 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon (casks included).
Onions—Madeira, $3·00 to $4·00 per 100 lb.
Pea Nuts—American, 6c. to 6½c. per lb. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$2·00 to $2·10 per barrel.
Rice—Ballam, $4·35 to $4·40; Creole, $4·25 per 177 lb., ex store.
Sweet Potatos—Barbados, $1·68 per bag, $1·92 per barrel.
Tannias—$2·64 per barrel.
Yams—White, $2·64 per bag.
Sugar—Dark Crystals, $3·03 to $3·15; Yellow, $3·20 to $3·30; White, $3·75 to $4·10; Molasses, $2·75 to $3·00 per 100 lb.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00, $3·75, and $5·50 per M.

Trinidad,—December 15, 1904.—Messrs. Gordon, Grant & Co.; and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red, $11·60 to $12·00; Estates, $12·00 to $12·30; Venezuelan, $12·30 to $12·50 per fanega (110 lb.).
Cocoa-nuts—$20·00 per M., f.o.b.
Cocoa-nut Oil—71c. per Imperial gallon (casks included).
Coffee—Venezuelan—9c. per lb.
Copra—$3·10 to $3·20 per 100 lb.
Onions—Stringed Madeira, $3·50 to $4·00 per 100 lb. (retail).
Potatos, English—$1·15 to $1·25 per 100 lb.
Rice—Yellow, $4·25 to $4·40; White Table, $5·25 to $5·50 per bag.

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(3) Seedling and other Canes at Barbados, in 1900. Price 2*d.* Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd. Edition Revised. Price 4*d.* Post free, 4½*d.*
(6) Recipes for cooking Sweet Potatos. Price 2*d.* Post free, 2½*d.*
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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOLUME III.

JANUARY TO DECEMBER 1904.

ISSUED UNDER THE AUTHORITY OF THE

COMMISSIONER OF AGRICULTURE FOR THE WEST INDIES.

Barbados: Messrs. Bowen & Sons, Bridgetown.

London: Messrs. Dulau & Co., 37, Soho Square, W. The West India Committee 15, Seething Lane, E.C.

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